

## ESSENTIAL ATROPHY OF IRIS.

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This records a case, seen after two openings had developed in the iris and tension of the eye was increased. The biomicroscopic findings are recorded. Reported to the Section on Ophthalmology of the Philadelphia College of Physicians, Feb. 17, 1927.

This paper is written to report an additional case of essential atrophy of the iris. Attention has been called to this interesting condition by Dr. G. E. de Schweinitz,<sup>1</sup> in a recent paper read before the American Ophthalmological Society in June, 1926. He wrote of the further progress of a case first reported by him in 1915, and analyzed the literature on the subject to date. Two additional cases have since been placed on record—the first by Kreiker<sup>2</sup> and the second by S. R. Gifford.<sup>3</sup>

Kreiker discussed the subject as a rare but distinct clinical entity and described a case. He advanced a theory to explain this type of atrophy, which will be referred to later. S. R. Gifford reported a typical case first seen before the onset of glaucoma and later when hypertension had manifested itself.

The details of the writer's case are as follows: Mrs. F., age 54, came to the Wills Hospital on June 20th, 1926, to have her glasses changed. Examination showed O.D. cornea clear and anterior chamber normal in depth. On the temporal side of the iris was a quadrilateral shaped hole  $3 \times 4$  mm. which involved all layers, beginning 1 mm. from pupillary margin, leaving the sphincter intact. At the ciliary border the picture resembled a deep basal iridectomy. There was no evidence of iris tissue, and thru this defect the margin of the lens and the fibers of the suspensory ligament could be seen. Another oval area of complete atrophy of the iris  $1 \times 1\frac{1}{2}$  mm. was located at the ciliary border above. Two similar shaped areas of thinning but not complete atrophy could be seen adjacent to and on the nasal side of

this last described atrophic area. Behind the largest opening was a circumscribed deeply located area of diffuse lens opacity, while thru the pupil another area, somewhat vacuolated in appearance, could be seen in the posterior cortex. A black floating vitreous opacity was noted. Other media clear. Disc oval  $\times 90^\circ$  well defined, slightly pale with marked scleral ring below, lamina cribrosa visible. Vessels dipped over lower and temporal margin sharply, but the cupping was not so complete on the nasal side and above where the vessels dipped gradually. Arteries and veins were small and straight. Macula and periphery negative. O. S. Iris normal, media clear. Disc oval, well defined, marked scleral ring below, central physiologic cupping lamina cribrosa visible, vessels showed no dipping. Arteries and veins normal in size and larger than O.D. Macula and periphery negative.

Both irides were dark blue, the right somewhat the darker. Tension O.D. 35 mm. Hg. O.S. 20 mm. Hg. (Schiötz). Vision O.D. 20/200 S  $-1.75 \text{ } \ominus \text{ Cyl. } -0.75 \text{ axis } 30 = 20/40$  partly. O.S. 20/30 Cyl.  $-0.25 \text{ axis } 60 \text{ } \ominus \text{ Cyl. } +0.25 \text{ axis } 150^\circ = 20/20$  partly. Add S $+3.00$  = J.1.

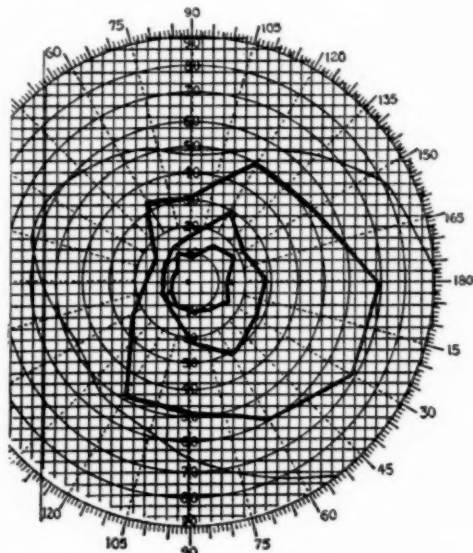
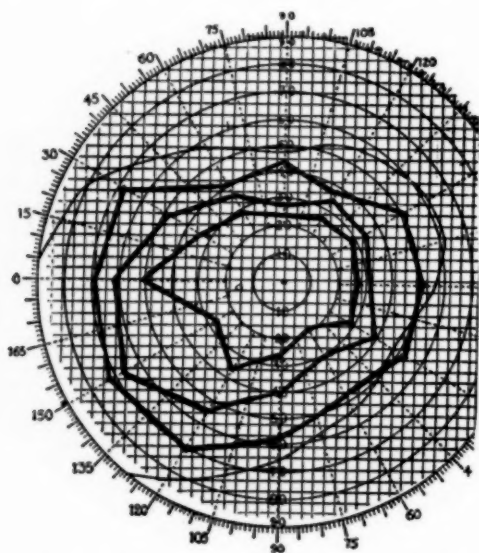
Urine—negative. Wasserman negative. The patient had measles, chickenpox and whooping cough in childhood and in later life pneumonia and smallpox. At present her general condition appears to be good.

The writer was assisted in the examination of the eye with the slit lamp and corneal microscope by Dr. Alfred Cowan, to whom thanks are due for

the following report: By direct illumination and high magnification, it could be seen that the endothelial cells lining the posterior surface of the cornea were almost completely destroyed. The usual honey-comb tracings of these cells had been replaced by a more or less regular peppering of light brown dots. These were not the typical pigment granules seen in low grade uveitis, but appeared to be the remains of disintegrated endothelial cells. By retro- or transillumination the entire posterior surface of the cornea pre-

pigment layer. This membrane, with clean cut edges, was turned out and laid flat upon the surface of the iris. The lens margin was clearly seen, and there were some yellowish spots in the cortex around the equator. Within this area, upon the surface of the lens, there were some fine pigmented strands resembling persistent pupillary membrane.

In one of the incomplete holes the stroma was almost entirely absent, leaving the intact retinal pigment layer exposed. Other large crypts showed



Figs. 3, and 4. Charts of field of vision showing narrowing of nasal fields for right eye. Fig. 3. Right visual field for form, red and green. Fig. 4. Left visual field for form, red and green.

sented a very fine bedewing. The anterior chamber was of normal clearness.

The pupillary margin of the iris showed several small breaks in the pigment border and two tiny translucent spots. There were a few pigment granules scattered over the surface of the iris. These conditions have often been seen in normal eyes of patients of this age.

In the two complete holes, only a few connective tissue strands of the deep stroma remained. In the larger gap, which extended to the extreme periphery on the temporal side, there was an ectropion of the brown retinal

complete loss of the superficial stroma, with the deep layer more or less intact, not unlike figure 297 in Vogt's Atlas. At no place could there be found the slightest sign of synechia, or other evidences of inflammation.

The writer was impressed with the appearance of the iris stroma bordering the atrophic areas. This tissue resembled the honey-combed and streaked appearance of snow which was rapidly melting under the influence of a warm sun and wind, leaving brush like strands of stroma.

In view of the completely atrophic areas of iris unassociated with any evident cause, and accompanied by a rise

in intraocular tension, it would seem proper to class this case as one of Essential Atrophy of the Iris.

The theories as to the cause of this condition have been reviewed by Dr. de Schweinitz, in the paper mentioned above. They were briefly three in number: (1) Disease of the iris vessels, toxic or otherwise, (2) Neurotrophic influences, and (3) "Abiotrophy," or an inherent cell weakness, that predisposes to atrophy or degeneration of tissue.

An additional theory has been proposed by Kreiker. He suggested that the biologic process, which is responsible for the absorption of the capsular and pupillary membranes present in intrauterine life, may continue in after life. The dissolving force in such cases attacks the normal iris and causes it to disappear. This assumes an active or positive absorption of the iris tissue, in contrast to the abiotrophic theory of early cell death.

Kreiker believed that the glaucoma was caused, not only by the absence of the iris, but also by the cellular detritus which occluded the angle of the anterior chamber. This in part agrees with de Schweinitz, who concludes, "that in typical cases of this affection

the iris atrophy is not caused by the glaucoma, which is the end result. Indeed, as the atrophy proceeds, the root of the iris is welded to the periphery of the cornea, a dissemination of iris pigment occurs, the iris surface available for resorption of the intraocular fluid diminishes, the glaucoma results."

There were certain features in the slit lamp examination which should be emphasized. There was no evidence whatever of any inflammation of the iris, which agrees with other observers who have examined such eyes microscopically. The fine pigmentation of the iris and migration of pigment (Koeppe's sign), seen in other iris atrophies and in glaucoma, was not present. In fact there was less pigmentation than is usually seen at the age of this patient. Lastly, there was the almost complete destruction of the endothelial cells lining the posterior surface of the cornea.

In conclusion the writer feels that slit lamp examination in all cases of Essential Atrophy of the Iris will not only aid in the exact determination of the nature of this disease, but may also contribute to our knowledge concerning certain types of glaucoma.

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## ARTERIAL SPASM IN PRODUCTION OF OCCLUSION OF BRANCHES OF CENTRAL ARTERY OF THE RETINA

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After reference to earlier literature, four cases are reported from the Section on Ophthalmology, Mayo Clinic, Rochester, Minnesota. Spasm of individual branches of retinal artery occur, causing transient blindness, which may become permanent.

For the explanation of recurring, transient, partial field, or total blindness, the theory of spasm of the retinal arteries is alluring, and is gaining in popularity with ophthalmologists. The theory is not based on a great number of accurate observations; but nevertheless it has been extended, in spite of opposition, to explain cases in which permanent blindness has followed a series of transient attacks. In such cases the spasm is supposed to have persisted indefinitely, or at least long enough to cause irreparable damage to sensory element of the retina. Just how long the spasm must continue to produce this effect has not been definitely determined.

A careful review of the published reports of cases of transient spasm of the central retinal artery and its branches has shown marked diversity in the ophthalmoscopic data and in the etiologic factors of the spasm, so-called. Most of the descriptions seem to indicate that the spasm is supposed to occur at a single point in the vessel, or in a small portion of its length; and that a varying amount of blood is left in the circulation in the artery peripheral to this point. It is difficult to obtain from such reports an accurate idea of the ophthalmoscopic appearance of a transient spasm in an individual branch of the central retinal artery. Necessarily only a few of these have been actually observed.

Wagenmann, on whose case Pal's extensive description of vasomotor crises is largely based, observed a spasm of the central retinal artery. Discussion of his and similar cases is hardly pertinent to the present subject. Berry reported a case of partial vasomotor constriction, in which he described opacity around a portion of one branch of the retinal artery and a corresponding scotoma in the visual field. The next day the edema and scotoma had disap-

peared and the constricted portion of the vessel had regained its normal caliber. Benson's patient, a man aged thirty-four, had for four years experienced numerous attacks of transient blindness, sometimes complete, sometimes affecting only a sector of the field. During a period of complete blindness, ophthalmoscopic examination revealed the inferior temporal artery entirely bloodless, for a distance of 4 disc diameters from its point of emergence. The bloodless section was seen to shift toward the periphery until it reached the next large bifurcation where it suddenly disappeared, leaving the blood vessels normal. The same phenomena were noticed during attacks of partial blindness.

Lundie saw his patient, a man aged eighty-eight, during an attack in which the lower half of the visual field was lost. He states that, in the upper main branch of the retinal artery, just beyond the margin of the disc, there was an interruption of the blood column in a section of the vessel somewhat less than 1 disc diameter in length. This section was seen as a whitish streak, but was entirely empty. On the proximal side, the vessel was of normal caliber; on the distal side, there was a continuous column of blood, less than in the other arteries, but not small. Later a small blood stream was visible in the white streak. In a few hours, the artery had returned to normal and the vision was restored. Crisp described in a girl, aged fourteen, following a sudden loss of vision in the lower half of the right visual field, an interruption of the blood current in the principal branch of the upper temporal artery for a distance of about  $\frac{1}{3}$  disc diameter, beginning a little beyond the margin of the optic disc. The empty part of the vessel appeared as a white band of the same width as the rest of the vessel, and cut off from the normal



portions of the artery at an abrupt transverse straight line at either end. After more than two weeks the vessel appeared as two blood columns of normal width, connected by a much narrower red strip.

All these cases are reported as arterial spasm. They fail to agree in particulars sufficiently to form an ophthalmoscopic picture which can be used as a basis of diagnosis by future observers. None of them corresponds to two definite spasms observed by one of us (Wagener). The list of diseases in which retinal arterial spasm has been said to occur is large and diversified. In few of these has the spasm been definitely observed. According to Wood, Hughlings Jackson saw the retinal blood vessels disappear suddenly while he was examining the fundus of an epileptic during a convulsion. If we remember that, normally, the walls of the retinal blood vessels are invisible and that we see only the blood column, then we should expect to see no trace of the vessel beyond the point of spasm. This was true in Jackson's case in which the central artery was involved, and in our two cases, in each of which a secondary branch of the central artery was affected. In one of our cases there was early hypertension, with a questionable vasoconstrictive response of the capillaries to cold; in the other, vasomotor neurosis of Raynaud's type associated with moderate essential hypertension. It is in these two diseases, essential hypertension and Raynaud's syndrome, that we might most reasonably expect to see transient spasms of individual retinal arterioles, as illustrated in Cases 1 and 2.

**CASE 1.** We first noted spasm of a retinal artery in a high strung, nervous girl, aged twenty-three, with the systolic blood pressure 160 and the diastolic 90. The heart was moderately hypertrophied. A diastolic murmur was heard at the aortic area and a systolic murmur at the apex. The cardiologists made a diagnosis of chronic endocarditis with aortic and mitral regurgitation. Blood cultures were negative and the valvular disease was thought to be quiescent. Renal func-

tion was adequate altho the urine contained some albumin. The Wassermann reaction on the blood was negative. Ophthalmoscopic examination disclosed moderate generalized constriction of the retinal arteries with slight arteriovenous compression (early signs of hypertension). It was observed that a branch of the left inferior nasal artery terminated abruptly about 2 disc diameters from the optic disc. No trace of a vessel was visible beyond this point. While this was being studied, the vessel extended suddenly as if with a pulse beat, for a space of about  $1/4$  disc diameter in length. A second pulse produced an approximately equal lengthening and a third suddenly opened the vessel out to the periphery of the fundus. The other vessels remained as before. The vision was entirely normal before and after this occurrence. Unfortunately the patient was not questioned with regard to transient attacks of blindness.

It is of interest that, during the following spring, after exposure to cold on four or five occasions, the patient noticed that the distal parts of her fingers, chiefly of the right hand, became numb, cold, and white. Death occurred the following year, apparently from an exacerbation of the cardiac disease altho necropsy was not permitted.

#### COMMENT.

The possibility of a small embolus must be considered in this case, yet the absence of a visible plug, the rapidity of the disappearance of the obstruction, and the absolute invisibility of the peripheral portion of the vessel made arterial spasm seem the best explanation. This view was supported by the identical ophthalmoscopic appearance in our second case, in which there seemed to be no possibility of embolism.

**CASE 2.** In this case, that of a woman, aged forty-five, there was moderate essential hypertension associated with vasomotor neurosis of the Raynaud type, probably on an arteriosclerotic basis. Her blood pressure ranged from 155 systolic and 100 diastolic to 170 systolic and 120 diastolic. The heart

was slightly hypertrophied but there were no valvular lesions. Renal function was adequate, altho the urine showed a trace of albumin and occasional hyaline casts. The Wassermann reaction on the blood was negative. There was moderate sclerosis of the peripheral vessels and rather marked capillary stasis, with resultant cyanotic flushing of the fingers and toes. The capillaries were vasospastic to cold. Ophthalmoscopic examination disclosed mild to moderate sclerosis of the retinal arteries, characterized by constriction of the arteries with exaggera-

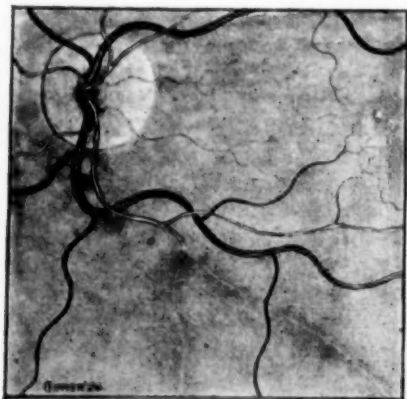


Fig. 1. Semidiagrammatic drawing of arterial spasm in Case 2.

tion of the reflex stripe, some irregularities in their lumen, and moderate arteriovenous compression.

The patient stated that for ten years she had had short periods of blindness, more frequently in the left eye, sometimes complete, at other times involving only a part of the visual field, at times in one eye, at others in both, but never complete in both at the same time. For five years she had noticed that her fingers and toes would become white, cold, and numb on exposure to cold, as when swimming in cold water, and would return to normal a few minutes afterward. For about three years she had had peculiar spells, lasting two or three minutes, of mental confusion without loss of consciousness. The first such attack came on following a cold swim. For two years she had had occasional nocturnal attacks of grand mal type.

At first it was assumed that the transitory spells of blindness were migrainous in character allied to the epileptiform attacks of petit and grand mal type. The fundus had never been seen during a period of blindness. On one occasion, however, while the patient was waiting in the dark room for a recheck of the condition of the retinal arteries, she noticed a sudden loss of the superior nasal field in the left eye, and on examination it was seen that the main secondary branch of the inferior temporal artery terminated abruptly a short distance from its bifurcation. The reflex stripe of the artery was exaggerated at the point of termination as if from constriction or endarteritis and beyond this point no trace of a vessel was visible. As in the preceding case, in three peripherally progressing pulses, the vessel and its peripheral branches reopened and the vessel became normally visible to the periphery of the fundus. Vision was immediately restored to the obscured section of the field.

#### COMMENT.

The fact that in both Case 1 and Case 2 the circulation was restored to the vessels in successive steps rather than instantaneously would seem to indicate that the spasm affected the entire peripheral part of the artery rather than a single point. The spasms observed microscopically in the nail fold capillaries are similar. In both of these cases, as in that of Jackson's, no vessel or vessel wall was discernible beyond the proximal point of the spasm. The semidiagrammatic drawing of the spasm as seen in our second case shows the course assumed by the blood current after relaxation of the spasm. The shaded portion of the vessel was entirely invisible during the spasm (Fig. 1). This invisibility of the vessel wall peripheral to the proximal point of the spasm furnishes, we believe, a basis for determining the influence of spasm in the production of permanent blindness.

Altho numerous cases have been reported it does not seem to be definitely proved that spasm of the retinal arteries can in itself be the cause of

permanent loss of vision. However, such an explanation has been urged in cases in which sudden permanent loss of a sector of the field of vision has occurred following recurring transient attacks, or even without them, particularly in young and often apparently healthy persons. Three typical cases are presented in which a different explanation seems more plausible.

**CASE 3.** A young woman, aged twenty, came to the Clinic because of reduced vision in the left eye. During the preceding six months she had had several attacks of blurred vision accompanied by a sensation of flooding of the eyes with light, and of numbness around the eyes. These attacks lasted about five minutes and were not associated with headache or dizziness. One night, about a month before she was seen at the Clinic, after having experienced one of the usual attacks in the afternoon, she awoke to discover that she was completely blind in the left eye. After about three hours the peripheral vision commenced to return slowly. Gradual improvement had continued since but a central defect was still present.

Vision was 6/6 in the right eye and 1/60 in the left. Visual fields charted on the arc perimeter were normal for the right eye, but showed for the left eye an irregular inferior nasal quadrant defect continuous with the blind spot and including the center of fixation. The right eye was found to be entirely normal. In the left eye the optic disc was pale, especially in the temporal half where there was considerable atrophy. The retinal arteries were all of rather small caliber. The superior temporal artery was disproportionately contracted and its lumen was apparently completely obliterated. It appeared as a white fibrous line, no blood column being visible. In spots this line was almost hidden by thickening of the surrounding retina. The retinal veins were normal. There were no other visible changes in the retina or choroid (Fig. 2).

General physical examination gave no clue to the origin of the eye changes. The systolic blood pressure was 112 and the diastolic 78. Urinalysis

was negative. There was no anemia. Roentgenograms of the chest, head and accessory nasal sinuses were negative. There was no evidence of periapical infection of the teeth. The tonsils had been cleanly removed. The spinal fluid was normal. There was no demonstrable lesion in the nervous system. At the age of fourteen the patient had had mild arthritis involving chiefly the finger joints and the ankles. There was, however, no demonstrable lesion of the heart.

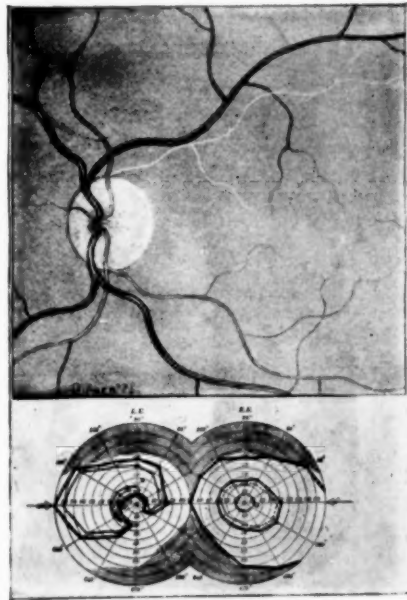


Fig. 2. Obliterated superior temporal artery and resultant field in Case 3.

**CASE 4.** A young woman, aged twenty, came to the Clinic because of loss of the upper half of the field of vision in the right eye. The loss of vision had occurred about eight months before, suddenly, without premonitory attacks, while she was eating ice cream after attending a moving picture show. There had been no change in the amount of vision since the defect was first discovered.

The vision was 6/5 in each eye. The field of vision charted on the arc perimeter was normal for the left eye and showed a complete superior altitudinal anopsia for the right eye. Ophthalmoscopically the left eye was normal. In the right eye, the lower one-third of

the optic disc was pale and showed some loss of substance. The retinal veins were normal thruout and the arterial branches supplying the upper portion of the retina were normal. The main inferior stem artery appeared normal as did a small branch supplying the macular region. The remaining three branches of the inferior artery were completely or partially obliterated, the main inferior temporal artery being reduced to a white fibrous cord, while the others showed very thin columns of blood coursing thru definitely thickened and visible arterial walls (Fig. 3).

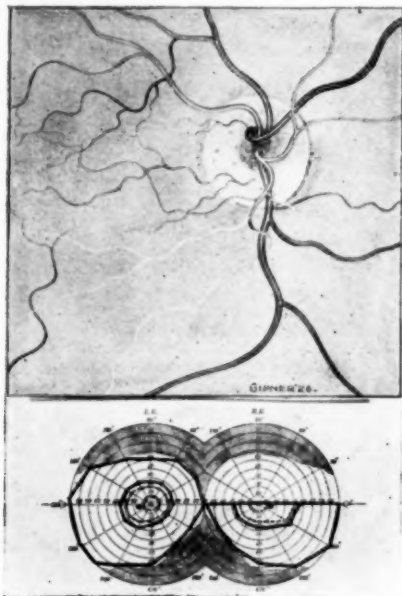


Fig. 3. Obliterated arteries and resultant field defect in Case 4.

On general physical examination a systolic murmur was heard at the apex of the heart which was interpreted as chronic mitral endocarditis with insufficiency. There was no evidence of activity of the valvular lesion, no petechiae, no anemia and no fever. The heart was not hypertrophied. The electrocardiogram showed inverted T-waves in Leads II and III. There was no history of rheumatic disease, but the patient had experienced several acute infections, including pneumonia, erysipelas and diphtheria. The tonsils had been cleanly removed. One area of periapical infection was present. Roentgenograms of the head, accessory nasal

sinuses, and chest were negative. The systolic blood pressure varied from 140 to 155 and the diastolic from 90 to 95. Renal function was adequate. The Wassermann reaction on the blood was negative. The neurologic examination was negative. Microscopic study of the nail fold capillaries showed no abnormalities and no tendency to vasoconstriction on exposure to cold.

CASE 5. A woman, aged forty-seven, came to the Clinic for a study of her general physical condition, her main presenting symptom being dyspnea on exertion. She mentioned having had "kidney trouble" fifteen years previously, high blood pressure for eight years, and "rheumatism" three years before. Eight years previously, after a full meal and nervous excitement, she had permanently lost a part of the field of vision of the left eye. For several months preceding the loss of vision there had been recurrent attacks of "flickering" in the same field. These came on every other day or so and lasted only a few minutes. There had been no recurrence of the attacks since the permanent loss of vision, altho a somewhat similar attack, lasting about five minutes, had occurred in the right eye; during this interval, she could not tell the time on a clock with the right eye.

The vision was 6/6 in the right eye, 6/7 in the left eye, with the proper refractive correction. A test of the visual fields by the confrontation method showed a normal field for the right eye and an upper nasal sector defect for the left. Perimetric field studies were not made. Ophthalmoscopically there was moderate sclerosis of the retinal arteries in each eye. Otherwise the right eye was normal. In the left eye there was, besides the general arteriosclerosis, marked diminution in the caliber of the main inferior temporal artery. The lumen was markedly constricted, only a thin blood stream being visible thru white thickened arterial walls. There was a small glistening patch overlying the artery a short distance from the disc margin. The lower temporal quadrant of the optic disc was pale. The macular region was apparently supplied entirely by a branch



from the superior temporal artery (Fig. 4).

On general physical examination it was noted that the heart was moderately hypertrophied with an accentuated second aortic sound and a systolic murmur at the apex. The electrocardiogram showed auricular fibrillation and inverted T-waves in Leads I and II. The cardiologist interpreted these findings as chronic rheumatic endocarditis with mitral stenosis and insufficiency, chronic myocarditis with dilation and hypertrophy, and auricular fibrillation. The systolic blood pressure varied from 180 to 190 and the diastolic from 100 to 115. Renal function was adequate altho these was some reduction in the phenolsulphonephthalein excretion. There was no anemia. The Wassermann reaction on the blood was negative.

#### COMMENT.

Cases 3, 4 and 5 presented rather different data from the general physical and ophthalmologic standpoints, but there were approximately identical ophthalmoscopic findings in the affected arteries. In two of them the history of preceding transient attacks of blindness was suggestive of arterial spasm. In one of these, no adequate cause for such spasm could be determined. In Case 4 there was no history of previous attacks, but the hypertensive disease would suggest a tendency toward arterial spasm, and the onset of the blindness during the exposure of the ocular region to cold might support the theory of spasm as the cause of the closure of one of the retinal arteries. However, in each of these cases, at least several months after the accident, the affected retinal artery was transformed into a white fibrous band either with or without a minimal blood channel. If we recall that, in the cases recognized ophthalmoscopically as spasm, the affected artery was entirely bloodless during the attack, it seems difficult to explain how these fibrosed vessels could be the result of spasm. If the spasm should remain permanent, which seems hardly possible, in spite of the claims of certain authors, we would expect to see

no trace of the vessel, or at least not more than a barely distinguishable thread. If, on the other hand, the spasm should relax after the nerve cells of the retina had been sufficiently damaged by lack of blood supply to be permanently insensitive, then the vessel should be normal in appearance and its blood channel of approximately normal caliber.

In two of the cases described, the possibility of embolism must be considered. In one of these the occurrence of preceding transitory attacks is against this explanation. In the other

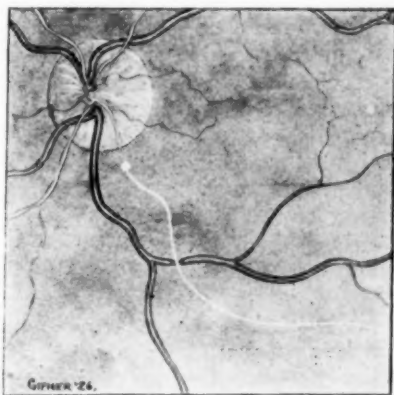


Fig. 4. Obliterated inferior temporal artery in Case 5.

there was no satisfactory source for an explanation of embolus and the mode of branching of the affected vessels made it rather unlikely that obstruction of all of them could have been caused by a single embolus. Again the late ophthalmoscopic picture in these cases is against the theory of embolism, for we expect in embolism to find the arteries beyond the point of obstruction markedly reduced in caliber, but not converted into white bands.

From the theoretic viewpoint, as well as from experience with the late ophthalmoscopic findings in definite thrombosis of branches of the central retinal veins and in endarteritic thrombosis of arteries, thrombosis seems to us to be the essential factor in the conversion of the vessels into ophthalmoscopically visible white lines. It seems most likely then that the essential etiologic factor in the permanent loss of vision in each of these three cases was

thrombosis of the affected arterial branch. In Case 3 the thrombosis was probably of inflammatory origin. In Case 4 it may have been spontaneous as the result of slowing of the circulation perhaps secondary to arterial spasm, perhaps peripheral to a small nonoccluding embolus in the main inferior artery. In Case 5 it was probably associated with endarteritis, the shiny white patch near the disc quite possibly being the result of fatty degeneration of an endarteritic plaque.

Many years ago Smith stated his belief that thrombosis was the cause of most such cases, and this view seems to be the most tenable one. Friedenwald believes that most cases of transient recurrent monocular blindness associated with hypertension and arteriosclerosis end in thrombosis of the central artery or its branches. That arterial spasm may be a factor in predisposing to such thrombosis is possible, either thru damage to the endothelium, as a result of poor nutrition in the recurrent attacks, or thru slowing of the blood stream in a vessel, the intima of which is already damaged by arteriosclerotic or inflammatory endothelial disease. But we do not believe that spasm in itself, without subsequent thrombosis, can be sufficiently prolonged to cause permanent occlusion of an artery or to injure the sensory elements of the retina in such a way as to produce a permanent absolute scotoma.

Cases similar to our last three have been reported by several authors under the title of spasm. In Zentmayer's case, the optic disc was pale and atrophic in the upper half. The superior retinal arteries were markedly contracted with white lines. In Hairi's case the affected artery was reduced to a white line. Beevor and Gunn describe optic nerve atrophy and narrowing of the lower arterial branch with periarterial sheath-

ing. In Jessop's case the superior nasal vessel was extremely narrow while the other vessels were normal. In Lundie's patient, at the time of onset, the affected portion of the retina was hazy, swollen and edematous. Later the arterial branch supplying the blind portion of the retina was extremely small, and, in parts, could be traced only with difficulty. In Greenwood's case there was sclerosis of all the arteries. The inferior temporal artery was reduced to a white band and new vessels had formed in this region. The upper temporal peripheral branches were obliterated also. In Eigler's case there was a visible white plug in the superior temporal artery. In Thompson's case the upper half of the disc was pale and atrophic. The upper arteries and veins were constricted at their point of exit from the disc and showed perivascular sheathing. The superior macular artery was much narrowed and almost obliterated; the other vessels were sclerosed. In our opinion none of these pictures could have been produced by spasm alone.

#### SUMMARY.

Spasm of individual branches of the central retinal artery does occur under certain circumstances and, in certain cases, it accounts for recurrent transient blindness in parts of the field of vision. The ophthalmoscopic picture in such cases is that of complete invisibility of the affected portion of the artery. When the blindness in such an affected sector remains permanent it seems most probable that thrombosis of the blood in this branch has taken place coincident with the spasm or immediately after its relaxation. It seems most unlikely that arterial spasm in itself can result in the transformation of an arterial branch into a white fibrous band. Such a white band is probably the result of arterial thrombosis.

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## OCCLUSION OF PUPIL WITH IRIS BOMBÉ AND SECONDARY GLAUCOMA. RECOVERY OF VISION AFTER FOUR OPERATIONS.

JOHN GREEN, M.D., F.A.C.S.

ST. LOUIS, MO.

In this case one eye was already blind with absolute glaucoma. The other was inflamed with high tension. Vision hand movements. Transfixion of the iris, iridectomy, extraction of the lens and later capsulotomy gave good vision. The blind eye was enucleated and its histopathology was described. Read before the St. Louis Ophthalmic Society, March 25, 1927.

F. F., a robust stocky negro, age thirty, was led in to the City Hospital Eye Clinic June 15, 1923, complaining of severe pain and loss of vision in his left eye.

For the past ten years there had been repeated attacks of inflammation in both eyes. Several years previously, after a particularly violent attack, an operation had been performed on the right eye, shortly after which it went blind. Up to a week prior to my first observation the patient had sufficient vision to enable him to drive a truck.

The right eye was stone blind with very high tension—absolute glaucoma; but, as is often the case with such eyes, without pain or signs of active inflammation. The glaucoma was evidently secondary to a former iridocyclitis, as the iris, which was atrophic and pressed forward to the posterior surface of the cornea, was adherent to the lens (or lens remains). There was no visible pupil, but a little groove in the iris above probably marked the site of

an iridectomy. There was marked thinning of the sclera in the ciliary region and one definite scleral ectasia.

The left eye showed a tiny irregular pupil, completely occluded, filled with exudate, with iris bombé. There was intense ciliary congestion and tenderness. Tension (Schiotz) 60 mm. Hg. Vision = H.M. at 1/2 meter. From all appearances, the eye seemed destined to go the course of its fellow.

On the following day, under general anesthesia, my assistant, Dr. C. A. Hobart, performed a Fuchs' transfixion operation. At the dressing the following day it was found that there were two tiny openings in the iris, which had flattened considerably. The pain was almost entirely relieved.

It is hardly necessary to state that the blood Wassermann was four plus. Nothing of importance was found on physical examination. The patient was put on active antisiphilitic treatment—mercurial rubs and potassium iodid. The eye quieted rapidly, lost its con-

gestion, and the slits in the iris remained patent. The tension, however, remained somewhat elevated, never going lower than 36 (Schiötz). Vision rose to 1/50.

With this fortunate outcome, it was deemed unwise to tempt Providence with any more operative procedures at this time; so the patient was kept under observation, with a continuation of mercury and iodides.

In February, 1924, the right eye became painful and was enucleated by Dr. Hobart. It may be of interest, as an indication of the course the left eye might have pursued, to present the following pathologic report of the enucleated eye prepared by Dr. Harvey D. Lamb:

"Cornea and sclera are thinner than normal; pannus degenerativus, without blood vessels, is present on one side, showing several cicatricial lamellae lying between the anterior epithelium and Bowman's membrane; anterior to the pannus, the anterior epithelium shows edema in its deeper layers. The limbus is advanced, encroaching on and destroying Bowman's membrane. The iris angle is closed for a considerable distance all around; in one place, between the iris and cornea, there is a large wedge shaped piece of cicatricial tissue, lined internally by serous exudate containing young fibroblasts; this wedge shaped mass is lined externally by Descemet's membrane. The iris and ciliary body are markedly atrophic, with intensive proliferation of chromatophores, most of them very large and coarse; one portion of the base of the iris, with the adjoining ciliary body and processes, has been transformed into dense cicatricial tissue: small lymphocytes and plasma cells are seen here and there in the iris. Large cystic spaces are seen between the epithelial layers on the posterior surface of the iris; there are broad posterior synechiae, in some of which there are thick masses of cicatricial tissue intervening between the iris and lens capsule; the pupil has evidently been closed by connective tissue. On the inner side of the ciliary body (in one part lying on and between the strands of the suspensory

ligament), there are many large cells with various shaped nuclei — bilobed, trilobed, kidney shaped, horseshoe shape, irregularly round or oval; the cytoplasm is quite small in amount, in proportion to the nucleus. The cells, as a whole, are round or oval. These cells are large mononuclear leucocytes showing transitional forms between the small lymphocyte and the polymorphonuclear leucocyte. Many of these cells contain varying amounts of large coarse granules of pigment. Many transitional lymphocyte forms containing pigment are seen. In the posterior part of the orbiculus ciliaris, there are seen areas showing marked proliferation of the pigmented epithelial layer, sometimes occurring very irregularly as narrow projections inward. The lens has, to a large extent, been absorbed, being represented by a thin disc, showing considerable calcareous change; in the middle, anteriorly, there is a rather large and thick cap of capsular cataract. The anterior hyaloid membrane is much thicker than normal; in fact, all the main elements of the vitreous network seem thicker than normal. The choroid shows atrophy with marked proliferation of chromatophores resulting in large coarse forms, with many capillaries and much newly formed connective tissue. Some of the capillaries show transitional form lymphocytes just outside the endothelium, arranged often in a single layer, resembling epithelium. The retina shows marked degeneration anteriorly with quite complete cystic degeneration of the rod-cone layer; proliferation of neuroglia cells has occurred irregularly. Ganglion cells are entirely absent; most of their normal positions are occupied by cystic spaces. In the inner layers of the retina there is a slight infiltration by plasma cells and transitional large lymphocytes; the same cells also lie upon and near the internal limiting membrane of the retina. The pigmented retinal epithelium shows everywhere a marked proliferation of pigment; on one side posteriorly it is uniformly thickened to two layers. The optic nerve shows marked proliferation of neuroglia, anterior to the lamina



cribrosa, and some edema of the papilla; the lamina cribrosa is bowed far backward; the nerve trunk behind the cribiform plate shows marked atrophy, with much secondary increase in thickness of fibrous septa.

"SUMMARY: Glaucoma secondary to plastic iritis. Avascular pannus degenerativus. Intense proliferation of chromatophores. Large mononuclear lymphocytes (transitional forms). Thickened anterior hyaloid membrane. Proliferation of neuroglia in glaucomatous cupping of the optic nerve."

The patient was given a job in the Shop of the Missouri Commission for the Blind, so that I was able to keep him under more or less continuous observation. In September, 1924, the left eye was white and quiet, tension had dropped to 31 (Schiötz). The openings in the iris were still patent. Vision, however, was tantalizingly low, 1/25, and the patient urged me to "do something." The visual field showed concentric contraction.

Without knowledge of the condition of the lens, it seemed problematic whether any visual betterment would follow an optical iridectomy. Even if the lens were clear it was practically certain that the anterior capsule was covered with a membrane, the product of the plastic inflammation. I believed, however, that under any circumstances, an iridectomy would not decrease vision and would provide a more adequate communication between the posterior and anterior chambers, than that afforded by the minute slits in the iris produced by the transfixion operation. It was conceivable that at any moment there might be a recurrence of iritis, which might readily lead to blocking of the small openings.

Accordingly, on October 17, 1924, after orbital injection of 2% novocain with adrenalin, a keratome incision was made at the limbus below, the iris was grasped with capsule forceps and a fairly large piece was torn loose and excised. There was considerable hemorrhage which was removed by irrigation with normal saline solution. After recovery, which was without incident, it was found that the newly

formed pupil was covered with a fairly dense membrane. Vision was not improved.

Several weeks later there occurred a violent attack of iritis with outpouring of fresh plastic material. The tension rose to 54 (Schiötz). Mercury was now pushed to the point of slight ptialism. I had now an opportunity to witness the excellent effect of subconjunctival injections of adrenalin in temporarily reducing tension. Six minims of a 1/1000 solution never failed to effect a prompt reduction of at least ten mm. Hg. Five such injections were given between November 29th and December 31, 1924. The iritis gradually subsided; and by February, 1925, the eye was white, tension 31 (Schiötz), vision 1/40.

Three possible courses now presented: (1) To do nothing. (2) To perform a discission. (3) To extract the lens.

As both the patient and I were greatly dissatisfied with the visual results so far obtained and as the eye had shown a capacity to recover satisfactorily from operative assaults, I decided not to consider the first possibility. An incision into or thru the lens would also have meant the incision and laceration of iris tissue with probable development of iritis incident to this traumatism. Aside from the danger of lens protein reaction, it seemed unwise to subject an eye with plus tension to a possible very acute rise of tension, incident to the swelling of broken up lenticular masses. Either or both of these contingencies would necessitate the evacuation of the lens material under most unfavorable conditions. Accordingly, the third course, namely extraction, was adopted. In order to safeguard the procedure as much as possible a "Husian" extraction was performed on March 2, 1925.

A large conjunctival flap—about the shape and dimensions of an Elliot flap—was separated down to the limbus. Sutures were inserted in the upper nasal and upper temporal margins. The incision, under the flap, was made with a broad keratome and enlarged laterally with straight blunt scissors.

Capsule forceps were used to grasp the iris, which proved to be firmly adherent. Nevertheless, a small piece was torn away and excised. Another pair of sharp toothed capsule forceps grasped the membrane incorporated with the anterior capsule of the lens, and after considerable traction and twisting a good sized piece was excised. The lens which was fairly firm and entirely transparent presented in the wound and was easily delivered, without loss of vitreous. The flap was replaced and the sutures tied. Again recovery was without incident, but again the visual result was disappointing.

Energetic mercurial treatment was continued thru the spring, summer and fall of 1925. October 8th, the blood Wassermann was reported negative. On December 28, 1925, ten months after the extraction, he entered the hospital for division of the membrane. A typical V-shaped capsulotomy (Ziegler) was performed, making both cuts long and free. I was gratified to note that immediately on joining the two cuts a large triangular flap retracted downward leaving a clear black pupillary opening.

Recovery was again without incident. With a cataract lens (+ 7.00 + 3.50 C. ax. 20°) vision = 6/15, which has been maintained from February 20, 1926 to date. He has been taken off the pension roll and has resumed his job as

a truck driver (tho without my approval). With +4.00 sph. added he reads I D type. Ophthalmoscopically, the media are perfectly clear; the disc is slightly cupped, but shows no signs of atrophy. There is a small area of retinal degeneration below the macula; the field is concentrically contracted. The only disquieting feature about the case at the present time is that the tension remains slightly elevated (31 to 35 Schiötz). Last August the patient fell down an elevator shaft sustaining a concussion of the skull, but without injury to his eye or impairment of vision.

Viewing the case in retrospect, I am inclined to the belief that one of the procedures—the iridectomy downward—might well have been omitted. It failed of its two purposes (1) to aid vision and (2) to prevent recurrence of iritis.

I attribute the final favorable result to the following factors:

(1) The prompt performance of the "transfixion" operation.

(2) Vigorous and prolonged anti-syphilitic treatment.

(3) A "Husian" extraction, protected by a large sutured flap.

(4) A free inverted V-shaped capsulotomy.

(5) Long enough intervals between operations to permit the eye to recover completely from each operative assault.

*Beaumont Medical Building.*

## PROCEDURE FOR CATARACT EXTRACTION.

PROF. DR. J. LIJO PAVIA, and DR. M. DUSSELDORP.

BUENOS AIRES.

Anesthesia is secured by instillation of cocain and injection of novocain behind the eyeball and at the limbus. A conjunctival bridge is formed above the cornea with a limbal incision under it. The lens is extracted by use of two loops and the bridge sutured to the conjunctiva on each side. Prolapse of iris, infection and keratitis are prevented; and rapid healing secured. From the Tornu Hospital, Buenos Aires.

Since cataract extraction replaced in the eighteenth century the primitive methods of treatment of blindness caused by opacity of the lens, innumerable methods have followed in which improvement is noticed, tending to avoid inconveniences or facilitate the different operative steps.

We grant that the classical cataract operation—simple extraction or combined—as practised by the majority of surgeons (simple, quick and efficacious in the majority of cases), presents in its favor statistics after long years of experience. But, not giving us an absolute percentage of success, altho

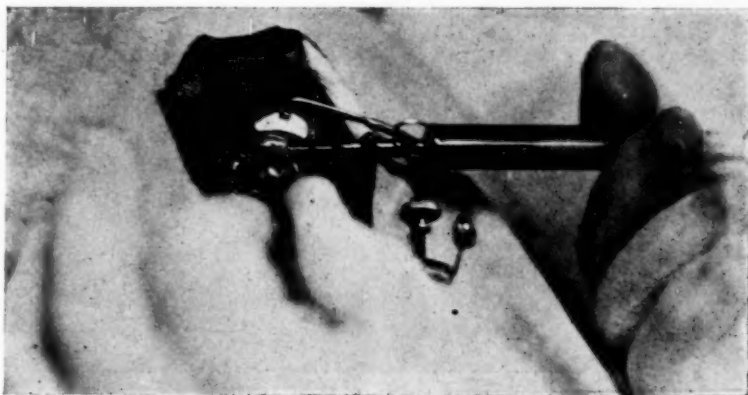


Fig. 1. Left eye. Making the subconjunctival injection where the bridge is to be made.

These improvements may be grouped in four classes: those that concern the anesthesia; those related exclusively to the incision of the cornea; those tending to secure more rapid and convenient healing, and those that improve the actual extraction of the lens.

With regard to the corneal incision, we believe that the superior corneal flap method, universally admitted, is the one that possesses the maximum of perfection. Concerning the extraction of the lens itself we have adopted the extracapsular, two loop method of extraction, considering it the most convenient in our sphere. Admitting the great advantages of the intracapsular extraction that has obtained such wonderful results in hands of Barraquer, we propose to study the appliance of the erisiphake in combination with our method.

the majority insist on perpetuating this method learned from their masters, it is logical that those who are not satisfied, owing to the failures and complications impossible to be foreseen, should seek in new methods a means of diminishing their frequency.

We decided from the beginning to give our whole attention to obtain a sure and efficacious anesthesia. Then, we directed our efforts to avoiding the serious consequences of possible unforeseen complications; and, lastly, to obtain a speedy and perfect cicatrization.

One most important factor for the success of the operation is the tranquility of the patient, which depends greatly on the degree of ocular anesthesia obtained; wherefore, from the beginning we assign importance to this antecedent step, essential in this opera-

tion. The patient not receiving any sensation, even of slightest discomfort, is usually docile; and does not make quick or unexpected movements of the eye, or eyelids.

Such misfortunes as the sudden escape of the lens and vitreous, and the eversion of the cornea, are avoided by the presence of an elastic obstacle, which acts as a brake avoiding the excessive separation of the two sides of the wound. This elastic band is secured by obtaining what has been called the "conjunctival bridge," and this same bridge, which during the operation offers us such advantages

dilatation of the pupil, using homatropin and cocain in a 2% solution, making several instillations in the preceding hours.

I. We perform the anesthesia by two injections; one behind the bulb, using a six cm. needle with a curved end which allows us to inject 2 c.c. of a 2% solution of novocain with a few drops of adrenalin, and another subconjunctival, directly in front of the limbus above, as illustrated by figure 1.

In the meantime, 4% solution of cocain is instilled to avoid the annoyance of the contact of fixation forceps and the retractor on the conjunctiva, as

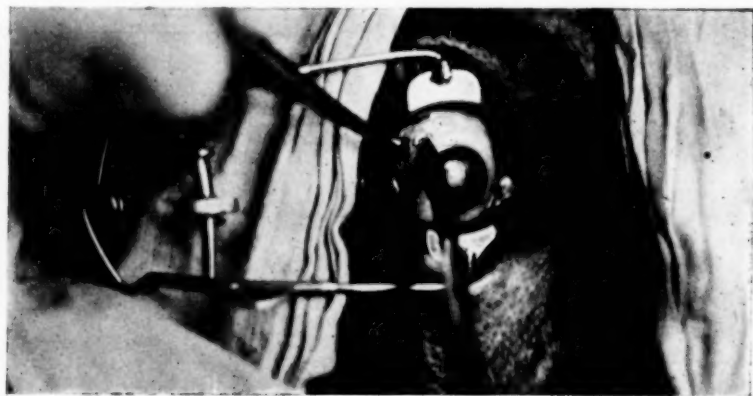


Fig. 2. Second step. A The scissors beginning the section. Right eye.

adds to them by securing a rapidly cicatrizing wound, thus avoiding the subsequent serious failures of its excessive delay.

On gathering in one method the advantages of the total anesthesia of the eyeball and the prior bridge secured by the posterior suture, we believe we have introduced an improvement worthy of being taken into account.

To be more explicit, we resume, in continuation the methods, whose authors have marked out the long route followed in search of the ideal method, to be prepared for possible misfortune and secure a good and speedy healing. We have tried to make a logical classification according to the principle characteristics of each method:

#### OUR METHOD BY ANTICIPATED BRIDGE.

Overlooking all references to preparation of the patient and operating field, we first try to obtain an ample

also 1/1000 solution of adrenalin, to render the field of operation more or less bloodless.

II. The surgeon places himself at the left of the patient to operate the left eye, and behind the head for the right one. The retractor is inserted and we proceed to dissect the conjunctival bridge, vertically upwards, the most convenient size being 9 mm. wide by 10 mm. long.

(a) The conjunctiva is seized above on the temporal side making a horizontal fold, on which the scissors perpendicularly make a vertical section, which will be extended upwards to complete 1 cm., which will reach the limbus exactly at 2 o'clock for the left eye and 10 o'clock for the right one (See figures 2, 3 and sketch of figure 10).

This incision will include the whole thickness of conjunctiva, to the epi-



sclera. We dissect from the outer side for each eye, on account of its easy performance and the large operative field this side offers, to follow out the next part of this step.

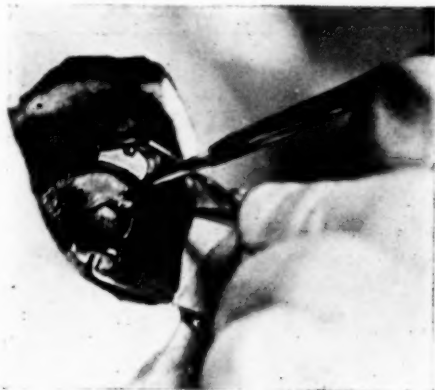


Fig. 3. Second step. B, The section almost finished. Left eye.

(b) The scissors are inserted thru the loop thus obtained to make a total separation of the conjunctiva, in all its length, which will comprise the bridge, as figure 4 illustrates.

It is important to have the bridge made by all the tissues to the episclera,

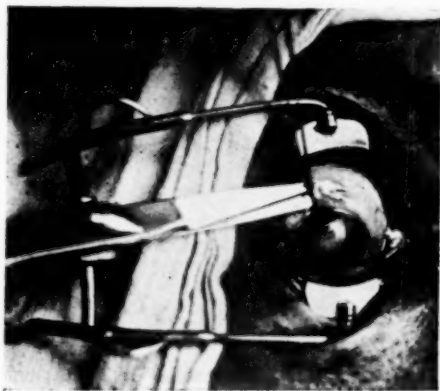


Fig. 4. Right eye. The scissors introduced by the temporal slit, dissect the conjunctiva.

and follow the incision exactly to the limbus.

(c) About 9 mm. from the first a second conjunctival incision is made 5 mm. long, parallel to the first, which will end at 10 o'clock for the left eye and at 2 o'clock for the right eye. The position of the scissors and the fixation

forceps during this second incision is illustrated in figures 5 and 6 and in the sketch of figure 10.

Generally the adrenalin instilled at the beginning, and that of the subcon-



Fig. 5. The loop made in Fig. 4 can be perfectly seen.

junctival injection, are sufficient to render bloodless the operative field. In the cases where a small hemorrhage occurs, a few drops of adrenalin deposited beneath the bridge and a few seconds wait, will be sufficient for it to disappear.

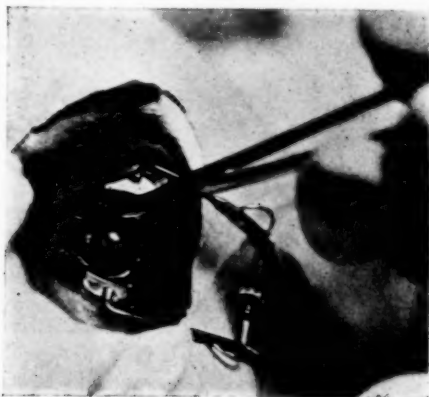


Fig. 6. Left eye. Bridge almost completed.

Figure 7 enables one to appreciate the aspect of the conjunctival bridge when finished.

III. The usual incision of the cornea is made, with the points of entrance and counterpuncture exactly in the limbus and near the horizontal meridian. The knife will follow the sclerocorneal

limbus above, passing beneath the bridge, appearing later in the subconjunctival space with facility.

The tendency to depress the knife behind must be avoided when nearing the bridge in which case the incision

fested by a slight traction of the conjunctiva with the forceps. The removal of the cataract is performed after laceration of the capsule with the cystitome or the capsulotomy with the forceps.

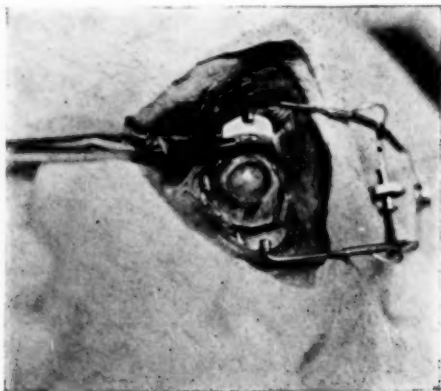


Fig. 7. Left eye. The scissors has been passed to show the finished conjunctival bridge.

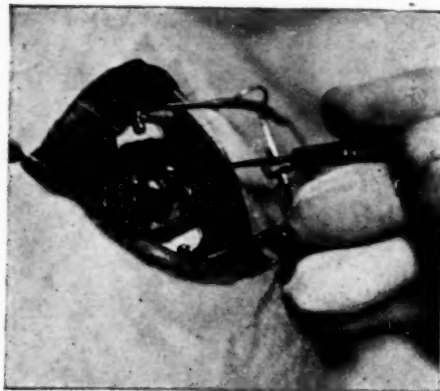


Fig. 9. Left eye. Fourth step showing the position at starting the extraction.

would end near the scleroidian angle, facilitating the consecutive pricking of the iris.

In figure 8 the surgeon has passed

For the extraction we use two loops, Weber's and Ziegler's, varying the handling according to the eye. For the right eye we hold Weber's loop in the left hand with the concavity up-



Fig. 8. Right eye. Having finished the third step, i. e., the section of the cornea the scissors are introduced with one tip in the anterior chamber and the other one lifting the bridge.

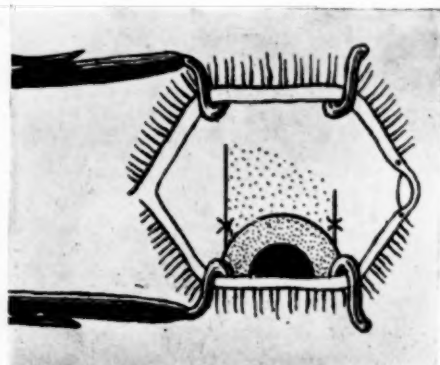


Fig. 10. Diagram showing width of bridge, 9 mm. external edge; 10 mm. length, internal 5 mm., and the two stitches each two millimeters from the limbus.

the half open scissors and the spatula behind the corneal conjunctival bridge so as to exhibit it.

IV. In each of the preceding steps and in this the patient is requested to look downwards, which need not be excessive, as with a slight inclination, the operative field is left free and the uppermost portion of the bridge mani-

wards; it is placed perpendicularly, edge on to the surface of the eye, at 5 o'clock, on the limbus to exert the pressure.

With the left hand Ziegler's loop is placed flat, with the middle of its dorsum resting on the eye at 11 o'clock, with its point under the bridge and its right branch at 1 mm. above the scleral

edge of the incision. The loop is slightly rotated on its longitudinal axis so as to allow it to rest on the sclerotic by its right and middle branches to afford the counterpressure.

For the left eye the lower loop is placed at a level with the limbus at 7 o'clock and the upper one at 1 o'clock, which we illustrate in figure 9.

With the loops thus placed, the pressure and counterpressure is commenced for the right eye, following the direction of the oblique axis passing thru 5 and 6 o'clock; and for the left eye the direction of the axis which passes thru 7 and 1 o'clock; both loops remaining fixed until the lens begin to insinuate itself, lifting the cornea and the bridge. At this moment the inferior loop is carried slowly upwards, without losing contact with the cornea and following the displacement of the lower edge of the lens, which on emerging lands on the upper loop, by which it is removed.

In both eyes we indicate the direction of the pressure outwards and upwards, obtaining the extraction of the lens thru the temporal side of the bridge, making the best of the larger field which the external angle affords.

In cases of difficult extraction of the lens, owing to a large nucleus, the point of Ziegler's loop is introduced behind the upper third of the back of the lens, already insinuated between the lips of the incision, by which means it is tightly held between the loops making the extraction easy.

The instrumental extraction combined with the existence of the bridge, presents the advantage of allowing the extraction without any loss of vitreous, even in cases where it is impossible to get the patient to lower the eye, these being the cases where the elastic tension of the bridge is appreciated at first sight, if the size and consistency conditions, which we have enumerated, have been carefully fulfilled.

If eventually pieces of lens remain in the pupillary region and anterior chamber, they are extracted by means of massage with the loop on the cornea, which may be completed by the introduction of Daviel's spoon.

V. During this step the bridge is sutured, taking  $1\frac{1}{2}$  mm. of free conjunc-

tiva and bulb conjunctiva, avoiding the episclera, and at 2 mm. from the limbus. The curved needles N° 4 and black silk N° 1 are used.

On knotting the ends of each stitch the edges of the bridge remain as shown in figure 10.

VI. Generally the iris does not get caught, but in any case it is convenient to habitually replace it. A spatula passed thru the corneal incision and to its angles will reduce the slightest incarceration that might have occurred. The retractor is then withdrawn and a few drops of a 2% solution of pilocarpin instilled.

Occlusion of both eyes.

According to the custom established by one of us, we give the patient, once the operation is over, a hypodermic injection of 2 c.c. of boiled milk mixed with an ampule of polyvalent vaccine, as a preventative of any possible infection, these being repeated at the first two dressings on the second and fourth days following the operation. Generally on performing the third dressing, a week after, the stitches come away spontaneously, or are otherwise cut under cocain anesthesia.

Notwithstanding its apparent complications, the operation is performed without assistants.

#### ADVANTAGES.

This method presents the advantages of total anesthesia of the globe, bridge and suture. With the total anesthesia we have sometimes been able to get as far as the last step of the operation without the patient having realized the different maneuvers. Moreover, there is the advantage of the slight hypotension of the eye produced by the retrobulbar injection, already pointed out by Van Lint.

The bridge which we obtain is of the width, length and thickness which we consider most convenient. The width of 9 mm. which we designate is the maximum which we consider the knife can easily take at the end of the corneal section. In the thickness we include all the tissues of the bulbar conjunctiva, and we limit its length to 10 mm. with the object of obtaining a bridge which, on account of its resist-

ance, may oppose in the fourth step the too speedy extrusion of the lens, and that on account of its elasticity may adjust itself solidly to the sclerotic, keeping together the edges of the wound.

The bridge, a few minutes after finishing the operation, forms fairly solid adhesions with its episclerotic bed, so as to maintain the corneal lips of the incision well coapted. An abundant supply by the posterior conjunctival vessels allows it to contribute to the nutrition of the upper sectioned portion of the cornea, and avoids any possible infection by covering a great extent of the wound.

The anterior chamber rapidly forms, postoperative marginal and striated keratitis is less frequent and very slight, healing rapidly. The inversion of the corneal flap is impossible, and

no delay is observed in the formation of the anterior chamber on account of a lack of wound cicatrizing. All our cases have formed their anterior chamber on removal of the first dressing 48 hours afterwards.

In a total of one hundred operations we have not had a loss of vitreous or postoperative infection. Two of the first patients presented incarceration of the peripheral portion of the iris, owing to having ended the incision too far back in the sclerotic. But correcting this technical mistake in the following cases, we have not had that misfortune again.

We have also applied this method in cases of luxated lens, in the anterior chamber or in the vitreous, with the double purpose of securing a speedy cicatrization and to limit the possible loss of vitreous.

## PROTEIN THERAPY IN PRACTICE.

BEN WITT KEY, M.D.

NEW YORK CITY.

This is an account of the practical applications of protein therapy. The indications for it, the selection of the best form of protein to be used, the time for resorting to it, the size and frequency of doses and its clinical effects are discussed. Two cases are cited to illustrate its efficiency. Read before the joint meeting of the Chicago Ophthalmological and Chicago Otolaryngological Societies, April 4, 1927.

In this paper I shall not review the history of protein therapy, or discuss the theory of the nonspecific reaction and its probable mechanism of effect. Nor shall I touch upon the now changing standards of bacterial activity, of specificity and immunity, in this connection. Nor can I more than refer to what is known today as "colloid chemistry," and the "colloidal state" of given substances, according to August Lumiere and others. Altho these theoretic and chemical phases of the subject are of intense interest—we hear recently from Lumiere that "the mechanism of the mysterious colloids holds in suspense the future progress of biology"—the time allotted to me will permit only passing references to them.

As a field of research, foreign protein therapy is no longer opposed by the standards of immunity. Its present status is due to the pressure of insistent demand on the theorist, by the

accumulating evidence of clinical results in both human and animal experimentation. Altho Ehrlich's side chain theory may best explain the specificity and mode of action of various antibodies, there is a growing tendency to explain many of these reactions on a physicochemical and colloidal basis. Antigens are substances that cause antibodies in the body fluids, and without exception are colloids and usually protein in nature. Furthermore, antibodies are colloid in their chemical characteristics; while they may or may not be solutions of colloids, they are, in the final analysis, products of cellular activity and therefore derived from colloids (colloid dispersions).

This study of protein therapy, then, embraces the questions of immunity, specificity, anaphylaxis, cellular sensitization and desensitization, as well as the physicochemical relation to infections. While these questions refer par-



ticularly to the mechanism of the reaction which follows a foreign protein injection, it is with these in mind that we should first select suitable cases for making our observations. Second, we should choose the most available and most potent form of protein to employ (animal, vegetable, bacterial). Third, we should determine upon the most effective method of injection (intradermal, subdermal, intramuscular or intravenous). And, finally, we should study the most appropriate time for the injection in relation to the time of other treatment.

As to the type of case, I believe it is quite necessary to establish a fairly definite etiologic diagnosis before one can draw conclusions. When we see authentic cases, for example, cases of subacute or chronic gonorrhea, cured by an attack of pneumonia, it seems to me to be a definite indication of the protein reaction. And when we must accept the evidence at hand following tuberculin injections in cases not tubercular, or even in tubercular cases, in which perhaps the effect may after all be the result of the high potential effect of the bacterial protein (dead tubercle bacilli) rather than a specific bacterial effect, it would seem that we must recognize the importance of such observations, and attempt to use this data in the further clinical and experimental study of this problem. In cases of pustule of the cornea and in serpiginous ulcer, we are familiar with the microorganisms commonly found in these lesions, and the effect of foreign protein therapy in these and similar cases has now become a matter of common report. In other words, staphylococci and pneumococci infection of the refractive media of the eye seems distinctly affected by the foreign protein reaction.

The indications, therefore, in which one may seem justified in administering it, may be enumerated as follows: In pustule of the cornea, in ulcer serpens and hypopyon keratitis, infection after penetration and panophthalmitis, idiopathic iritis and iridocyclitis (hidden focus of infection), keratomalacia and sympathetic ophthalmia, and for prophylactic purposes in certain cases. It has been employed, however, for dis-

ease of almost every anatomic element of the eye, also for the different infections to which the eye is exposed, and without any regard for the pathologic or bacteriologic diagnosis. These observations are obviously confusing and doubtful, and do not contribute at this time to the real value of the therapy, or to solving the problem of its effect on the organism.

It is quite obvious that the best opportunity for observing the clinical effects of the serum is offered by cases of penetrating wound of the cornea with infection, because the only effective local treatment is that of hot fomentations and atropin, antiseptics being of little value. Whereas in ulcer serpens with hypopyon, the effect of cauterization and antiseptics cannot be as clearly separated in many cases from the effect induced by protein injection. However, numerous cases of hypopyon keratitis, in spite of intensive and persistent local treatment, have been observed to progress steadily until the protein injection was given.

In regard to the selection of the most suitable, highly potential foreign protein available, antidiphtheritic serum, as it is now prepared and concentrated, offers perhaps the best form for administration to the human. Because milk varies in its potential and toxic action, numerous commercial preparations are now undergoing experimentation. Normal horse serum, "aolan," "yatrencasein," "ciba" (cibalbunin, aseptic solution of egg albumin), albumose, proteose, nonspecific vaccines, etc., have not yet been shown to possess, with any certainty, a more reactive and potential effect than that of antidiphtheritic serum. "Aolan" has been heralded as a preferable form, because it does not produce a noticeable systemic reaction. This is strange, since a positive systemic reaction, that is to say, a moderate rise in temperature, etc., is believed to be *necessary* in order to establish the preanaphylactic stage of hypersensitivity and thereby increase the resistance which is the therapeutic effect. Furthermore, the dosage and reaction of other preparations are *uncertain*.

The dosage of the antidiphtheritic serum is certainly more definite and its

anaphylactic effects are more clearly understood. Banzhaf's method of preparing the serum by isolating the antitoxin globulins permits the use of a concentrated serum, which lessens the incidence of serum sickness and facilitates the administration of larger doses. According to Park, this method gives a concentration of about six times the original potency. Darier, Frogier and others claim to have shown that it is ten times more potent than normal horse serum; which they claim may be due, not only to its high concentration and method of preparation but also, perhaps, to the constituents attributed to the diphtheria bacillus, or toxin.

Moreover, the theory as to the properties and structure of antibodies in immunity lends striking evidence (Vaughan, Kraus, Ichikawa, Ludke) that there may be a direct antagonist, a special antigen or protein (globulin) in the serum more active than a mere animal protein (horse serum, milk, egg albumin), the method of concentration of the serum adding to the concentration of the antibody elements in the serum. If there is any virtue to be had in the nonspecific diphtheritic elements (colloids?) in the serum, it would seem that antidiphtheritic serum has the decided advantage and preference over other forms of proteins employed in this therapy. Furthermore, the facility of obtaining and administering suitable doses of antidiphtheritic serum is a distinct advantage not to be overlooked.

As for anaphylaxis, a concentrated serum is not so likely to produce serum sickness as whole serum, since a smaller quantity of it is injected. The history of previous anaphylactic conditions, previous diphtheria, status lymphaticus, asthma or hay fever like attacks in persons proved susceptible in a stable and horse environment, are well established as probable contraindications to serum injections. I have not observed serious anaphylactic effects in any case (now about 300 cases treated) and doses have varied from 1 to 6 c.c. (1,000 to 5,000 units)—a total in one case of 14 c.c. (12,000 units, given in 3,000 and 2,000 unit doses). These doses are pitifully small when

contrasted with those frequently given even for prophylactic purposes in diphtheria (5,000 to 10,000 units), not to mention those employed for the full therapeutic effect (10,000 to 20,000 units). Verhoeff recently reports the injection of 20 c.c. (about 16,000 to 20,000 units) *every* day for a period of about two months in a case of sympathetic ophthalmia, in which he claims a cure. My own experience, however, has taught me some respect for the highly potential effect of antidiphtheritic serum, and also that small doses of 3 to 4 c.c. (2,400 to 3,200 units) are harmless, and yet are sufficient to produce a moderate systemic reaction, just short of anaphylaxis.

The time of injection and the size of the dose have been given much consideration and have been referred to with some emphasis in my previous reports. The matter of anaphylaxis is of importance in this regard, because sufficiently large doses are essential, just as they are in the treatment of diphtheria, in order to produce a suitable reaction and effect. This is necessary because the serum is almost immediately effective (ten minutes after injection, Rosenau), and this stage of preanaphylactic effect, representing the incubation period of disease, is the period of gradually increasing sensitivity of the body cells to the foreign protein or disease element (bacteria) as a measure of body defense against the invader. The first stage of anaphylaxis is known to be one of exhilaration and stimulation, followed by one of depression, paresis, arrest of breathing, etc. For this reason, it is my practice, after cauterizing an active ulcer of the cornea, to have the serum injected as soon as possible. For the same reason, we find an explanation for the constant observation, that the effect of the serum is manifest always within twenty-four to forty-eight hours after injection, the time of hypersensitivity and cellular reaction. It is clear, therefore, that the time of the injection is important, as well as the size of the dose and the relation to local treatment.

In this connection, I believe it is generally recognized that hypopyon keratitis is rarely seen in a strong,

healthy young individual, and when such cases are observed, intensive local measures alone quickly yield the usual good result. On the other hand, we find seriginous ulcer occurring commonly in the aged and in debilitated individuals, usually following upon the neglect of a local injury; and the center of the cornea, the area least protected by systemic resistance, is the area almost invariably affected. Here the problem of cause and effect is obvious. The question of virulence of the infecting microorganism on the one hand and the defensive powers of the host on the other is evident. In an effort to secure a fixed virus of staphylococci by standardizing the virulence of a certain strain thru "passage"—and thereby suitable dilution of this virus—I have attempted to obtain that dilution which will produce by puncture of the corneal stroma the slightest but active ulceration of the punctured area. These experiments are reported in the *Atlantic Medical Journal* of March, 1925. It is clear that by this more certain means of standardizing the virulence and controlling the dosage of the infecting microorganism, the matter of resistance becomes the more direct unknown quantity in the problem of cause and effect. It was found that these dilutions varied greatly with the different strains of staphylococci taken from various parts of the body, the most virulent strains being those taken from the eye. The dilution was as great as 1 to 30,000 (.01 c.c. of bouillon culture of staphylococci diluted in 300 c.c. of normal salt solution) in order to secure the minimum dosage that would produce the slightest but active ulceration of the rabbit's cornea.

The practical value of this is evident in this study, because we are able thereby to observe the relative value of different forms of protein as well as the dosage necessary to produce the therapeutic effect; and from this one can more definitely measure the resistance of the animal to the inoculation. Furthermore, it makes one realize how minute must be, as a rule, the average quantity of microorganisms first infecting the eye in a clinical case of hypopyon keratitis, or even in a penetrating

wound, therefore if a highly potent foreign protein can be injected before the infection has become overwhelming, a satisfactory result may be obtained, instead of what otherwise might have been a calamity, and this surely is deserving of our knowledge of these facts.

With these theoretic and clinical phases of the subject in mind, I have, during the past two years, confined my study to the inoculation of the true cornea with the staphylococcus pyogenes aureus, observing the effects of intramuscular injections of antidiphtheritic serum as against concentrated horse serum, milk and typhoid vaccine, in the attempt to compare the relative value of each. In this series of twenty-six experiments, it was necessary to inoculate seventy-four rabbits' corneas. Where any effect from previous inoculation, and possible immunity thereby, could interfere in any sense with correct interpretation of the results, that animal was eliminated. The rabbits used were about the same within reasonable limits as to uniform size and weight. Usually six were inoculated in each experiment, two being injected with antidiphtheritic serum, two with typhoid vaccine, or milk, or horse serum, and two used as controls.

Up to this time the results have shown, that in almost every instance where any difference could be noted, the animal which had received the foreign protein injection showed the least corneal reaction to the infecting microorganism. On the other hand, no important difference between the effect of antidiphtheritic serum, concentrated horse serum and typhoid vaccine could be observed in any of the experiments. Sterile milk, tho used in only two experiments (twelve rabbits being inoculated), showed no effect whatever, and the corneal lesions were similar in every way to those of the control animals. The results of these experiments were presented in some detail before the American College of Surgeons, in October, 1925.

As to protein therapy in practice, the following method of treatment is suggested: Intramuscular injection seems to be preferred to subcuticular, intra-



venous or oral administration, as variously advocated by different observers. Two to six c.c. (representing 2,000 to 5,000 units) of antidiphtheritic serum, varying with the age and weight of the patient, is injected at the earliest possible moment after local treatment, this dose being repeated or modified in forty-eight hours, depending on the reaction observed after the previous injection. A third and even fourth dose may be given, at forty-eight hour intervals, without fear of serious anaphylactic symptoms, if the previous dose has failed to produce a local and quite active systemic effect. Four c.c. (about 3,200 units) is the average dose employed and seems to be just as effective as larger doses. Clinically, I have not observed serious anaphylactic symptoms from antidiphtheritic serum, but I have seen alarming symptoms from typhoid vaccine used for immunizing purposes; I have also seen alarming symptoms from milk injections.

Obviously, protein injection should never be relied upon alone to combat an infection, since no claim is made for it as a germicide. In hypopyon keratitis, I have always cauterized the ulcer with phenol, followed immediately by alcohol (50 percent); in advanced cases, multiple incisions are made thru the ulcerated area, followed by the cauterization. This is done because the ulcer is one of the violent type, almost invariably located centrally, most frequently occurring in patients past middle life, and to delay local intensive measures in order to observe the serum effect would prove little and risk much. In the case of penetrating wound with infection early observed, where hot fomentations and atropin are the only local means of value, and in cases of beginning ulcer of the cornea, in both of which conditions the threshold of resistance of the patient is made higher by protein injection, local treatment has been found unnecessary. This is borne out by personal observation clinically, as well as by animal experimentation, both of which I have shown and reported. This does not argue in any sense, however, against the necessity for the employment of local intensive measures; but is mentioned merely for

the purpose of demonstrating the efficacy of the systemic reaction in cases where the invading microorganism has not become overwhelming.

A local measure which I have used in some cases, and which I believe to be of value, is subtenon injections of warm hypertonic (2 percent) salt solution, given a few hours after injection of the serum, for the purpose of increasing the permeability of the capillaries and stimulating leucocytic activity.

A recitation of detailed case reports at this time would be unfitting and unnecessary. But two case reports in illustration may be of interest.

#### CASES

J. S., aged 6 years, was admitted to New York Eye and Ear Infirmary, February 21, 1919, suffering with an active phlyctenular pustule of cornea. Phlyctenular conjunctivitis had been present for the duration of a month. On admission the usual catharsis and feeding, with local hot bathing and administration of atropin and argyrol, were carried out until March 15, three weeks after admission, when a line of hypopyon appeared. The next day there was 2 mm. of hypopyon and the corneal process and iritic reaction were more violent. Without any change in the local or general treatment and without any surgical interference or cauterization, 1,000 units of serum was injected. In twelve hours the hypopyon had completely disappeared, and the conjunctival and corneal reaction was improved; in forty-eight hours the eye was almost entirely quiet, and three days afterward, March 22, the patient was discharged, the eye being open and only slightly injected. It cannot be doubted that here a systemic influence was causative in the pustule with hypopyon, and that it was promptly met by the systemic effect of the serum.

F. C., male, aged 29, was admitted on March 27, 1922, with a penetrating wound of the cornea, no hypopyon. The third day, in spite of the usual intensive local treatment, hypopyon of 2 mm. developed over night. The lips of the wound were whitish, the entire



cornea was hazy, and there was the usual iritic reaction. Not until hypopyon developed was the serum injected (3,000 units). A peculiarly violent local and constitutional reaction followed—great edema of the injected arm, temperature of 101.5 F., nausea and headache, mild erythema of arm and body; but in twenty-four hours there was, coincident with this general reaction, relief of ocular pain and definite reduction in the hypopyon, which disappeared entirely in forty-eight hours. Daily improvement (clearing of the anterior segment) allowed his discharge ten days later. This complete reversal in the behavior of an anterior infection can be attributed only to sudden systemic stimulation ("omnicellular plasma activation" of Weichardt) and increased local resistance. I presented this patient in person before the New York Ophthalmological Society and also before the New York Academy of Medicine.

#### CLINICAL EFFECTS

Finally, what are the clinical effects upon the organism to be observed after protein injection? These may be outlined as follows: First, the systemic reaction, and second, the local or therapeutic effect. The systemic reaction is expressed (depending on the character and amount of the agent injected and the sensitization of the particular individual thereto) by a slight chill, rise in temperature, variations in pulse and blood pressure, sweating, nausea, nervous irritability, skin reaction, glandular activity, permeability of the capillaries, lymphagogue effect and certain variations in the blood—such as concentration, altered coagulability, leucocytic response, increased antiferment and alteration in the antibody titer of the serum of the patient. The study of this reaction has grown out of Nature's own method of resistance and repair, constantly demonstrated by the reaction from counterirritants, vaccines, enzymes, drugs, yeasts, colloidal metals, bacteria, etc. It is believed, therefore, that in a similar manner there is brought about in the body true tissue stimulation and activation, the therapeutic effect being produced by altering the reactivity of the

whole organism, rather than by directly influencing the cause of the pathologic process.

The focal or therapeutic effects observed in cases of hypopyon keratitis may be numerated as follows: In from twenty-four to forty-eight hours after the initial injection, the hypopyon is reduced or has disappeared; if not, some complication may be found to explain the effect (as occurred in four cases which I have reported, three of them syphilis, and one unaccounted for). Hypopyon may reappear with increased corneal and conjunctival reaction, when injection of the serum is delayed or discontinued (as reported in detail in seven cases of a series of twenty-three), but almost invariably disappears promptly when injection of the serum is resumed (the same local treatment being administered). Beside the noticeable effect on hypopyon there is relief of pain, rapidly subsiding conjunctival and iritic reaction and a clearing away of ulcer debris, such as does not usually occur in these cases, the ulcer itself taking on a clear and clean appearance early in the process of repair. The result of this prompt healing and clearing away of ulcer debris is found in the surprisingly slight opacities which remain, and in many instances the vision obtained is far beyond expectation.

The effects to be observed in cases of penetrating wound with infection are in every way similar to those occurring in cases of hypopyon keratitis, the anterior segment clearing remarkably, and in some instances almost as rapidly as the infection had developed. In overwhelming infection and panophthalmitis, altho no curative effect can be expected, there is often relief of pain, and the anterior segment gradually becomes clear and transparent and free of hypopyon. In idiopathic iritis, when the focus of infection cannot be found, antidiaphtheritic serum has been employed with success that I hardly dare to quote. I have used it in three cases only, but could not be sure whether the curative effects should be attributed to the protein or to other intensive measures employed. In *ulcus serpens*, before hypopyon develops, the results are quite uniform, and indi-

cate the type of case particularly adapted for the administration of protein therapy. In these cases and in early cases of penetrating wound, and in most cases of hypopyon keratitis the therapeutic value of protein therapy is undoubtedly demonstrated.

In conclusion, I do not wish to be regarded as overenthusiastic about this subject, but I feel that I can suggest that you administer antidiphtheritic serum in your next five cases of penetrating wound with infection, or of hypopyon keratitis, before the infection has become overwhelming, and then draw your own conclusions.

Furthermore, I wish to affirm that "colloid chemistry" in medicine has come to stay, and the sooner systemic and serious research of the varieties

and forms of protein (animal, vegetable and bacterial) and their particular reactions to infection, is carried out, the more valuable will become our therapeutic strength to combat disease.

On the other hand, I wish to state with some seriousness that we should not draw conclusions about protein effects too quickly. But rather we should sift the data and take stock, as it were, from time to time, as to what has been shown to be reasonably true. We cannot accept all that is reported and published, for protein therapy is too popular today to be all that is claimed for it. It is by no means a "cure all." In such instances the credulity of the laity and even of the medical profession, is at stake.

*100 W. 59th Street.*

### FRAGMENTS OF GLASS IN CORNEA FIVE YEARS SHOWN BY SLIT LAMP.

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BOSTON, MASS.

Injury from broken glasses five years before was followed by recurring inflammation. Repeated examinations did not show the cause. Biomicroscopy revealed two small fragments of glass in the cornea. They were removed and no inflammation had recurred in nine months.

During the past two or three years the use of the Gullstrand Slit Lamp and Corneal Microscope has become much more common in this country. Interest in the use of this instrument was very much increased about two years ago when Mr. Basil Graves of England and Professor Koeppe of Germany gave courses in this country on the use of the slit lamp. The writer attended the courses given by both of these men, became very much interested in its use, and has since been employing it in hospital work most of the time, and at present is also using it in his private practice. There are two factors which have worked against a more general adoption of this instrument in routine practice. One is the high cost of the instrument; and the other the fact that it increases somewhat the amount of time necessary for the examination of a patient, and the fact that it does not eliminate any other method of examination used at the present time.

In the majority of cases it does not give us any additional information. Yet

in certain cases it does yield information of vast importance. This is very well shown in the case here reported. The eye is the only place in the human body where it is possible to put the living tissues under actual microscopic examination. The study of living tissue by this means is very fascinating and is adding to our knowledge of pathologic processes and reactions in the eye.

The case here reported is of interest because of the length of time fragments of glass remained in the cornea, the method of locating it, and the subsequent history after its removal. The writer does not know of any cases where glass has remained in the eye five years and then been removed.

#### CASE REPORT

J. M., age 55. Occupation, fireman. Patient was seen January 8, 1926, at the O. P. Department of the Boston City Hospital, at which time the writer was requested to examine patient's right eye with the slit lamp, by Dr. J. J. Corbett.

**HISTORY.**—Five years ago, when cutting some wood, a stick flew and struck glasses, breaking them, fragments of glass cutting skin of lid and several pieces lodging in right eye. He was treated immediately after the injury. Several pieces of glass were found and removed, and as far as could be determined, there was no glass left. Since that time he has had rather frequent recurring attacks of inflammation of the eye, which have only temporarily yielded to treatment, has been to different hospital clinics and consulted other ophthalmologists, but without obtaining permanent relief. Hospital records show that he has been treated for repeated attacks of keratitis. He had been examined by focal illumination and the loupe, but no foreign body discovered.

In the effort to find the cause of this patient's recurring attacks of keratitis Wassermanns had been done, focal infections sought for, and general examination made. Results, however, had been unsatisfactory as far as curing the condition was concerned. The present attack of inflammation was of several weeks' duration, accompanied by more or less pain, considerable photophobia, increased disturbance of vision. Right eye. Marked ciliary injection, cornea very hazy, numerous spots where the haziness was much more dense. Examination by focal illumination and loupe does not reveal any foreign body.

**SLIT LAMP EXAMINATION:** Using a magnification of 23. The surface of the entire cornea is very rough, with several lines of opacity running thru lower part of cornea. In the lower temporal quadrant, about 3 mm. from the corneal margin, are seen two spots having a glistening crystal like appearance; the smaller one lying at about the junction of the outer and middle thirds of the corneal thickness. The larger one has an irregular base, and at the other end narrows to a point, and lies in the inner third of the cornea, the point almost reaching the anterior chamber. There is a vessel extending from the corneal margin to the larger of the foreign bodies. The opinion was expressed that these spots probably were glass. A definite diagnosis was not made at this time, as it

was thought best to make a later examination to ascertain if there occurred any change in the appearance of these spots.

January 15, 1926. Eye reexamined with slit lamp. No change in appearance of spots previously mentioned in cornea. A definite diagnosis made of foreign bodies in cornea, probably glass. Advised patient to enter hospital for purpose of having glass removed.

January 20, 1926: Admitted to Boston City Hospital.

January 22, 1926: Operation, under local anesthesia. Examined cornea with slit lamp, to again localize the foreign bodies, then patient was placed on table; and by means of very strong focal illumination and the corneal loupe, it was possible to identify the two spots. The cornea was very carefully incised with the point of a cataract knife, until first piece of glass was reached and was finally dislodged from its location and removed. That had to be all done with the point of the knife. Incision was then carried deeper into cornea until second foreign body was reached and this finally removed. It was much more difficult to remove the second piece because of the roughness of cornea caused by removal of the first, making it more difficult to keep the location in view. Because of the fact that the point of this piece was located close to the inner surface of the cornea, great care had to be used, not to force it thru into the anterior chamber. Patient was again placed before the slit lamp, and as far as could be determined at this time both pieces of glass were removed; but due to the disturbance of the cornea by operative procedures, this could not be definitely determined. The eye was then bandaged. Following the operation there was very little reaction. Cornea healed promptly.

January 27, 1926: Examination with the slit lamp showed conclusively that the more superficial piece of glass was absent, but there was some blood infiltration deeper in the corneal tissue, this having come from the blood vessel which has been previously mentioned; so that the location of the deep-

er foreign body could not be well examined.

February 5, 1926: Eye reexamined with slit lamp. Cornea is now sufficiently clear to definitely determine that all of the glass has been removed. At this time there is not much ciliary injection. Cornea is very much clearer.

March 12, 1926: Patient reports to the O. P. D. and states that he has not had any discomfort in eye for some time. Cornea very much clearer, no ciliary injection, and blood vessel, which extended from corneal margin to where glass had been located, is very much decreased in size and somewhat decreased in length.

Patient continued to report at intervals to the O. P. D. for examination. In April he had a mild recurrence of inflammation which was of short duration. Patient was seen in June, at which time there was no congestion of the eye. Eye perfectly comfortable and there was further decrease in corneal haziness.

February 4, 1927: Patient reported to the O. P. D. at the request of the writer. At this time he reports that he has not had any active inflammation of the eye for the past nine months. At the present time there is no congestion of the eye, the cornea is very much clearer than when last seen. The slit lamp shows a marked decrease in corneal infiltration and the blood vessel extending from corneal margin has disappeared.

COMMENT.—In view of the fact that there is such a large number of people

who are wearing glasses at the present time, injuries to the eye because of breakage of lenses is comparatively rare. In this case, there were pieces of glass in the cornea which had remained there for a period of five years resulting in a great deal of inflammation and discomfort to the patient. If the foreign bodies had been pieces of metal or other colored substance, they would, of course, have been located a long time before. But these being transparent glass, it was not possible to localize them by any means except the slit lamp. After orientation with this instrument it was possible to keep their location in view, by means of focal illumination, and the loupe, and in this way effect their removal.

Both of these foreign bodies were completely covered superficially by corneal tissue. Their presence, however, apparently acted as a constant source of irritation resulting in the recurrent attacks of keratitis, for which the patient had been treated over such a long period. There was not, however, at the time of examination by the writer, any evidence of pus apparent about these pieces of glass. The fact that these foreign bodies were the cause of the patient's trouble seems to be well proved from the fact that since their removal there has been a long period of freedom from irritation, and the fact that at the present time the eye is entirely quiet and there is no evidence whatever of any inflammation.

82 Commonwealth Ave.

## SPLINTER OF IRON ON THE RETINA

JULIUS FEJER, M.D.

BUDAPEST, HUNGARY.

A splinter of iron entered thru the cornea and iris and lodged on the retina in the lower temporal quadrant. It was moved by the Haab magnet, but not drawn forward. The eye remained quiet with V. 5/5 two months afterward. Reported from the Ophthalmological Department of the Jewish Hospital, Budapest.

Splinters of iron, fallen into the retina or vitreous, mostly provoke irritation of the eyeball. If they bring infectious substance into the eye, symptoms of purulent endophthalmitis will soon develop, leading rapidly to shrinking of the eyeball. If the foreign body enters the eye in a sterile condition,

and does not injure the crystalline lens—does not cause traumatic cataract—it may settle and be ensheathed in the eyeball, or in the vitreous, remaining there quiet, without causing any reaction, altho cases are mentioned when such a foreign body in the vitreous or retina began to be troublesome after



many years, and even endangered the other eye.

The case given below happened to a locksmith 39 years old. On August

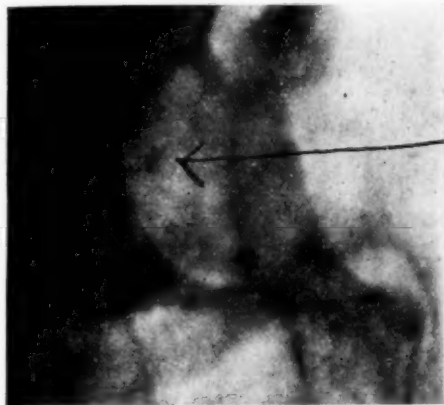


Fig. 1. Radiograph showing shadow of foreign body indicated by arrow.

22, 1926, while hammering iron, a pointed splinter of iron flew into his right eye. The splinter was broken from the jaws of the cramp, since the locksmith examined the edge of the

same and discovered the place of the breaking. He presented himself for admittance in the hospital on August 27th, when a 1½ mm. long little wound was to be observed, oblique, stuck together on the right cornea, besides the limbus, at 8 o'clock. Corresponding to the wound, there was in the root of the iris, almost in the angle of the anterior chamber, a black hole of irregular shape, about the size of the head of a pin. Thru this red light was to be obtained. Depth of the chamber normal, lens intact, no trace of irritation on the eyeball, iris, except the mentioned defect, intact. Vision 5/7. With feeble general illumination, a little, fine floating clouding of the vitreous was to be observed.

On the eyeground, with dilated pupil, in the inverted image, with the patient looking outward and downward, in the upper, inner part, there was to be observed a whitish stain, almost quadrangular, of the size of the papilla, in the upper, inner corner of which a small foreign body appeared, strongly reflecting. This had, therefore, trans-

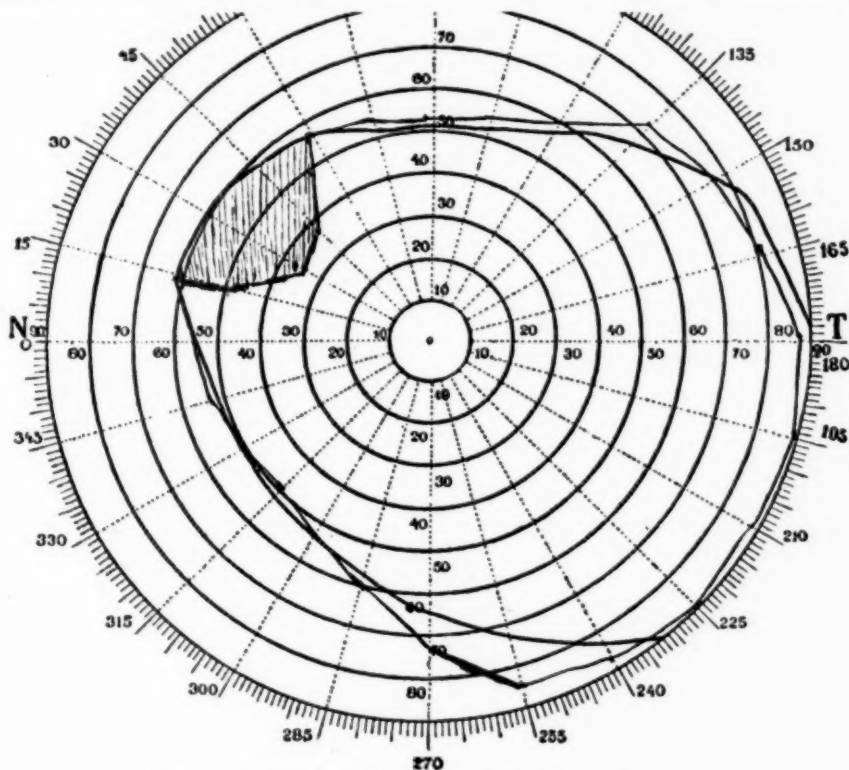


Fig. 2. Field of vision showing loss in upper nasal quadrant.

fixed the cornea, pierced a hole in the root of the iris, gone round the lens and settled down in the outward, downward quarter of the retina, near to the "ora serrata." Tension normal, left eye entirely normal, vision 5/5, fundus intact. On the 28th, we tried a magnet operation. We set the patient with cocaineized eye before the Haab magnet. The patient indicated pain, and with the ophthalmoscope we saw that the magnet moved the foreign

from the hospital, calling him in once every week for controlling examination.

Now, two months after the hurt, if we are examining the eye with an ophthalmoscope, and if the patient is looking outwards and downwards, in the inverted image upwards and inwards, we may see an area of black of the size of  $1\frac{1}{2}$  papillas, with irregular borders, in the center of which there is also a whitish scarry part. At the distance



Fig. 3. Foreign body on retina as seen with Gullstrand ophthalmoscope. Direct image.

body from its place, drawing it forward and upward. At the distance of a papilla from the old spot, a new white stain arose, on the border of the gleaming foreign body and with bleeding. According to the Röntgen examination, in the back part of the orbit, between the ciliary body and the ora serrata a shadow is to be seen, about the size of a millet grain and of a metallic intensity. See figure No. 1. The repeated magnet application extraction was without result.

Examination of the visual field (campimeter) shows that in the upper, inner corner of same, according to the shape of the foreign body, there is a gap,  $45^\circ$  broad and  $20^\circ$  long. See Figure 2. As the good vision and the normal visual field of the eye remained nearly intact, we dismissed the patient

of a half a papilla from it, and 2 or 3 diopters before it, there is a black foreign body, rhomboid shaped, paralactically displacing, bordered with a whitish edging, and even a net appears thereabout, consisting of black points. This black thing is the splinter of iron, leaning on the retina, being before it and lying in the back layers of the vitreous. The pigment degeneration beside it, with the whitish stripes and points, show already signs of the scarring. Present vision of the eye is 5/5. The patient, however, sees now and then a black circle, chiefly when he is looking into the sun.

The picture of the eyeground (Fig. 3), prepared skilfully and true to nature by Dr. Hollós, Assistant Physician of the department, clearly demonstrates these circumstances.

The case described above, and exhibited at the meeting of the Hungarian Ophthalmological Society, held October 29th, demonstrated that even a heavy, penetrating hurt can have a lucky issue. I cannot tell how long the eyeball will endure the splinter of iron without reaction. The eye is to be observed and as soon as the first irritation appears, or the splinter stirs

from its place, it must be removed by a magnet operation, thru a scleral wound. Under the present circumstances we can still wait; the removal is not yet advisable. Regarding the later fate of the eye, or the eventual removal of the foreign alien body at a later period of time, I shall give a report.

### ROUTINE KERATOMETRY.

DORLAND SMITH, M.D.

BRIDGEPORT, CONN.

The improved keratometer is an accurate, reliable, time saving instrument for diagnosis. Mastery of it is gained by routine, exact measurements. Variations formerly disposed to discredit it now give valuable information of conditions formerly unrecognized. As a preliminary and as a control method it supplements skiascopy and the test lenses. Read before Eye, Ear, Nose and Throat Section of Connecticut State Medical Society, May 26, 1927.

The ophthalmometer of Javal and Schiötz, more precisely called a keratometer since it measures only the astigmatism of the anterior surface of the cornea, has been known and used in various forms since 1881, nearly fifty years. Yet if the question were asked today in almost any group of eye men,—"Is the use of the keratometer in ordinary refraction worth while?" opinions would vary, some answering "No," while others "Decidedly yes." That it is not worth while was the former opinion of the writer, which survived several years' irregular use of various models; but impressions that keratometers are unreliable and impracticable were finally proved erroneous for him by routine use of a good instrument.

These impressions now seem to have been due to a lack of full appreciation of modern keratometry's technic of precision and its possibilities, and therefore of the kind and quality of assistance which keratometry could bring to general refractive work. Since the wide variance of opinions about keratometry may well be due to similar impressions in the minds of others, a brief discussion of the writer's present conclusions in regard to (1) these impressions, (2) exact technic, and (3) the practical use of routine keratometry, may help us toward an agreement as to the value of keratometry and its place in refraction.

Altho the principle of the keratometer was always fundamentally sound its earlier models were clumsy, and often very far from accurate. Those defects limited its use in the early days, and created an impression which tradition has handed down to us that keratometer records are never quite dependable. The defects have been largely corrected in the latest models, and the instrument developed to one of simplicity and precision. The old impression of general unreliability inherent in the instrument persists, however, since unreliable keratometer records are unfortunately still very common because of unappreciated faults of technic in its use. The reasons for this are admirably stated in the American Encyclopedia of Ophthalmology (p. 4712) as follows: "To successfully operate the ophthalmometer it is necessary to use the instrument very carefully and precisely. Many incorrect estimates as to the value of ophthalmometry are due to opinions being based on results obtained by inexperienced hands. The operation of an ophthalmometer is not a mere mechanical procedure, which one person may do as well as another. It is a procedure which requires skill and study, and in which one becomes more proficient after prolonged use, the same as one gradually becomes skillful in ophthalmoscopy by continual practice."

The other quite common impression

is due to the fact that altho the keratometer measures the corneal part of the astigmatism accurately, even when its amount is small, it tells nothing of that small part of the astigmatism due to the lens, which may be present in any case, tho much less frequent than corneal astigmatism. The combined, or total astigmatism, therefore, has to be measured, objectively with the skiascope and subjectively with the astigmatic dial or letters at the trial case, whether the keratometer is used or not. Since this is the measure of the astigmatism from which glasses are prescribed, it is natural to think that the use of the keratometer for corneal measurement may prolong the examination without contributing additional information of sufficient value, and be therefore a refinement rather than a real aid. This seems to be true at first, until one has learned to use the instrument both rapidly and precisely, as one uses the ophthalmoscope and retinoscope. Most ophthalmologists then find that measurement of the corneal astigmatism shortens the total time of the examination, by making the measurement of the total astigmatism quicker and often more accurate, especially as to axis, and is of value in other ways. Experience indicates that the real value of the keratometer only becomes fully apparent when one can be sure of getting a quick and dependable record from which accurate inferences may be drawn; and, like other instruments of precision, this requires careful routine use.

The accuracy of a keratometric record, without which it has little value, depends primarily upon having a good modern instrument, a dependable technic in its use, and a suitable patient. The instrument should be kept in good condition by avoiding rough usage, by keeping the cap on the tube and the whole instrument protected from dust by a cloth when not in use, and by cleaning the lenses occasionally, especially the eyepiece. A piece of soft paper over the chinrest is a comfortable addition for the patient in cool weather. A dark room is unnecessary. The ordinary office is usually dark enough without drawing the shades, unless to exclude the glare of direct

sunlight, or to obtain sufficient contrast in patients with light irides and very small pupils.

The essentials of lighting for keratometry are well stated by Dr. Jackson in a communication to the writer, as follows: "All that is necessary is that the general lighting of the room should be so proportioned to the light from the mires, that the relatively weak reflection of the latter from the transparent cornea should not be overcome by light from other sources." It is an advantage to have enough diffuse light for the patient to see and fix the reflected image of his own eye in the object lens, and for the examiner to see to read the scale and to record the readings. For the latter, a small pad with pencil attached is convenient.

Since an unreliable reading wastes time and confuses the examiner, an accurate technic must be acquired by strict attention to details, some of which seem very obvious, yet are so often overlooked as to need specific mention. One should see that the forehead is placed and held firmly against the headrest, and that the face is exactly centered in the frame and straight vertically, so that the axes as read can be surely depended upon. The eyes will then be horizontal, and the tube can be swung from one to the other without vertical adjustment, unless one eye stands higher in the face than its fellow. The eyes should be at about the same distance from the lens, and therefore at about the same focus. Slight degrees of ptosis and other abnormalities are often recognized while adjusting the instrument to get the pupil in the center of the field. Exact centering by means of the cross hairs, which are not always visible, is unimportant.

The most important thing is to make sure that the eye under examination looks directly into the center of the telescope, so that it is surely the visual center of the cornea which is being measured, not a more peripheral area with a different curvature. Many patients are not quite comfortable when one eye is covered and will move the head, unless watched, so as to see by the edge of the shutter with the other eye and so get binocular vision. The record in such position is unreliable.



Both eyes should be kept wide open, or the reading is difficult as well as undependable because of changes in corneal curvature due to varying amounts of lid pressure. When the Primary Axis is recorded, the black line should be exactly straight and continuous across the two mires, or as straight as it is possible to get it, or if uncertain, at the average between the two positions on either side where it surely commences to break.

One should see that the mires just touch when exactly in focus, neither overlapping in a faint white line, nor separating by a hair line of black, and are not further separated by any rotation. On rotation till the cross black line is again exactly straight, usually just 90 degrees, the secondary axis is recorded. If not just 90 degrees, it is well to repeat to make sure of both Primary and Secondary Axes. The exact amount of overlapping of the mire images should be noted and recorded, taking into consideration not only the white overlapping part of the last overlapping step, but also the remaining black part by which it fails to overlap the full step. One can thus recognize quarter steps easily and surely up to about 4. D. On good patients, by noting that the overlapping varies from the full step by less than a quarter, one can often see and record eighth diopters. This is much more difficult to estimate from the half step, and is then perhaps too fine a reading to depend upon surely, tho it is well to try for it and record it for practice in accurate observation. Upon this record also may sometimes depend just which cylinder to prescribe, especially in patients whose answers at the trial case are not definite. When the amount of overlapping varies at first, if both eyes are kept as wide open as possible, it usually steadies to a fixed amount which can be read.

In swinging to the second eye, it should be again noted that the face is squarely centered and straight, that both eyes are wide open, and that the eye under examination looks directly into the center of the tube. The reflection of the patient's pupil in the object lens, if it can be seen, makes a good point of fixation. After finding

the primary axis exactly, the amount of adjustment from that of the other eye, if any, necessary to make the mires just touch should be recorded. This often gives a valuable hint as to whether the eyes are just alike in the horizontal axis, and also as to whether an apparent anisometropia is real, or perhaps due to more spasticity, or less complete cycloplegia, in one ciliary muscle than in the other. After making the same careful readings for the second eye as for the first and recording them, both eyes should be quickly rechecked.

Seven items are recorded for each case: viz., the exact primary and secondary axes of central corneal curvature and the exact amount of overlapping to a quarter diopter, or less, for each eye; and the difference in primary axis adjustment between the two eyes. At first this routine takes time; with practice it is usually finished in from one to two minutes. Exceptionally, cases with asymmetry of the axes requiring rechecking, cases where the amount of overlapping or the position of the axis varies at each check, and cases of irregular central astigmatism, take more time. Ophthalmometric examinations lasting over five minutes, however, are hard for the patient and are apt to be unreliable. In squint cases, or if one eye is amblyopic, it is well to make the record on the better eye first, then have the patient hold that eye closed with the fingers while the poorer eye is under examination, in order to get the latter to fix.

Certain correction always must be made in the reading. Since the cornea is thinnest at its center, its anterior and posterior surfaces are not quite parallel and so have a slightly different curvature, both spherical and cylindrical. The cornea and the aqueous also have slightly different indices of refraction. These facts give rise to slight errors, the sum of which usually amounts to about half a diopter. While theoretically variable, this error is practically so nearly constant as to be sufficiently correctable by the following rule: In astigmatism with the rule, subtract from the reading 0.50 in overlappings up to about 2.25 D., and 0.25 D. in overlappings from 2.50 D. to 3.25

D. Add to the reading 0.25 to 0.50 in overlappings over 4 or 5 D. In astigmatism against the rule this is of course reversed. With oblique axes, the error is in general less as the axis approaches 45 to 135 degrees, altho it never quite disappears. This rule seems a little more accurate than Burnett's rule of similarly subtracting or adding 0.50 in all cases.

With sufficient care, an accurate keratometric record can thus be made upon more patients. Dark eyes or large pupils make it easier. With a small pupil and a light iris background, it is sometimes difficult to read closer than half diopters, especially if the cornea is small and its curvature great. In eyes which will not open widely, or have very long lashes, any reading may be difficult. In a few cases accurate record is impossible, or the record is so uncertain that it must be almost disregarded. Such are corneal scars with grotesque readings, axes indeterminable or never twice the same, and amounts of overlapping varying widely while under examination. The latter occurs from varying amounts of lid pressure, inability to keep both eyes wide open, in what seems to be compensatory lid pressure to overcome corneal astigmatism, and sometimes in high hyperopia. Such cases are relatively infrequent. In some of them, however, tho no accurate record is possible, the keratometer gives a hint as to what is really going on.

An accurate measure of the corneal astigmatism as a routine part of refraction, is useful in several general ways. First it may be made to increase both speed and accuracy. Cylinders should not be prescribed from it alone, since it is not the measure of the total astigmatism, unless noncorneal astigmatism is proven absent by retinoscope and trial case. It is, however, in the majority of cases, the quickest close approximation to the total astigmatism obtainable by any means. Such approximation greatly lessens the preliminary work of the retinoscope and trial case, which may then be used, first as a check for possible lens astigmatism, and second, if any is found, to determine the total astigmatism by

variations from this approximation, which may be done much more quickly and often more accurately than without such a lead. The measure of the corneal astigmatism must be exact, however, or it will be a false lead and so be only confusing.

The use of Keratometry as a check on technic is less obvious but no less valuable. In a very large number of cases, especially in young people, an accurate keratometric record and an accurate retinoscopic record will agree in amount and axis, and be confirmed by the record of the trial case. In all such cases, if each record is made to serve as a check upon the accuracy of the others, faults of technic in each may be discovered and corrected, so that each may come to be equally dependable in cases where noncorneal astigmatism causes real disagreement. Until one is sure of this, if one has obtained what he believes to be an accurate record of the corneal astigmatism and the check with the retinoscope does not agree, great care should be used in rechecking before assuming that the cause of the disagreement is lens astigmatism, which is quite rare under thirty, or that a clear keratometer record is misleading. There may be an error in the retinoscopy, which requires for accuracy even more attention to detail than keratometry. Especially when there is a faint corneal opacity, or when the pupil is dilated and peripheral shadows are confusing with the retinoscope, should the keratometer record of the center of the cornea be given full value, unless the trial case surely disagrees. It should also be remembered at the trial case, especially when no cycloplegic is used, that the habit of the ciliary muscle often prevents acceptance of full cylindrical correction at once, and sometimes distorts the axis; and that failure to center the trial lenses and to see that the line of vision is perpendicular to their surface, may give a cylindrical effect to any lens at any time. When one is equally sure of the accuracy of his keratometric, retinoscopic, and trial case technic, because of the exact agreement of their records in cases where no lens astig-

matism is present, he can be sure of measuring both lens and corneal astigmatism and their changes accurately. In some cases this is of distinct importance.

A third general use of routine keratometry lies in the direct attention which it calls to the axes of the astigmatism in the two eyes, and to any lack of symmetry therein. Without such attention, the axis of the dominant eye is apt to be more carefully determined by many refractionists than that of the weaker eye, especially if they have to work rapidly and if the weaker eye is slightly amblyopic.

Specific use of accurate keratometry, in the experience of the writer, may be made in four types of cases: The first type is that of the majority of young people, where simple astigmatism is regular and entirely corneal. When this is measured accurately in amount and axis with the keratometer, if retinoscopy and trial case examination confirm this measurement thus excluding lens astigmatism, cylinders may be prescribed from the confirmed measurement much more quickly than if the astigmatism were worked out by retinoscope and trial case alone; and because of their check upon each other more accurately, unless the retinoscopy and subjective examination are more than usually painstaking. In compound cases, the keratometer settles definitely the corneal astigmatic factor. If this is temporarily assumed to be the probable total astigmatism, the spherical factor may be more easily and quickly determined. The actual total astigmatism, if this differs from the corneal astigmatism, is then readily measured. It is in this large class of cases that the keratometer is a material timesaver as well as an aid to accuracy. Especially is this true in children, in patients whose illiteracy or lack of keenness make the subjective examination with trial lenses unsatisfactory, in feeble patients whose subjective examination must be short, in refracting without a cycloplegic, and in clinic refraction under high pressure, where if keratometer and retinoscope agree, much less time need be spent with cylinders at the trial case.

A second type is that in which irregular corneal astigmatism is present and the retinoscope gives little precise help. The black line may not be quite straight and continuous in any position of rotation, the keratometer may be made to find the meridians of least and greatest curvature and the total astigmatism of the cornea at its visual center, which are very helpful in the trial case examination which is otherwise apt to be tedious. In rare cases the axes of the corneal astigmatism are not at right angles to each other. Dr. Holloway has seen this without demonstrable corneal lesion, and it may occur in cases where the astigmatism is partly irregular, usually from scars. Such astigmatism, theoretically correctable by cross cylinders with axes not at right angles, but at those indicated by the keratometer, may be best corrected by a sperocylindrical lens of proper strength and axis which exactly equals the effect of such cross cylinders, as was pointed out by Dr. Jackson in 1886.

Changes in astigmatism present a third type: especially the development of astigmatism against the rule in late middle life. The commencement of such a change, which is sometimes a prodrome of glaucoma, is most readily recognized with the keratometer. Early recognition of small amounts is also important, whether corrected or not, that proper allowance may be made therefore in the angle of reading glasses, especially if not toric. The rapid changes in the astigmatism following cataract extraction are also most easily and surely measured in this way; and conical cornea in its early stages is less readily overlooked if one uses the keratometer routinely.

In the types so far discussed, lens astigmatism is usually absent or negligible, tho it should always be looked for. In the fourth type, definite lens astigmatism is present. Here the total astigmatism, worked out by retinoscope and trial case, really differs from the corneal astigmatism found with the keratometer. If both of these are accurately measured the difference between them is an equally accurate measure of the noncorneal astigma-



tism, most of which is in the lens. Exception to this may theoretically occur, where marked developmental faults at the optic nerve entrance cause the fundus level to lie closer to the lens above the macula than below it, and also in abnormal astigmatism in the posterior surface of the cornea. With such rare exceptions, any real difference between the total astigmatism and the astigmatism shown by the keratometer after correction by Burnett's rule, is mostly if not all due to the lens. Its amount is usually small, tho it may be occasionally as much as two or three diopters, and is frequently variable. The writer believes that corneal astigmatism is in origin largely hereditary, following the same laws of inheritance as do the features of the face, and that it should almost always be corrected by glasses, at least for close work, if it exceeds 0.50 with the rule or 0.25 against; that lens astigmatism, on the contrary, is not usually hereditary, is more subject to change, and less often needs complete correction. It is well known that changes in lens astigmatism sometimes occur quite rapidly, and are probably either the result of changes in lens position such as tilting, of changes in lens curvature from irregular or sectional contraction or spasticity of the ciliary muscle, or of changes in lens structure such as incipient cataract, but the causes and laws of such changes are little understood. Lens astigmatism, in some cases at least, seems to be compensatory to corneal astigmatism, as it is most often seen in the higher grades of compound hyperopic astigmatism with an active or irregularly spastic ciliary muscle, especially in older people who do much close work without having had good correction in glasses. The total astigmatism is here less than the corneal astigmatism by the amount of the compensatory lens astigmatism, and may have a slightly different axis. It has been the experience of the writer in a few such cases that if glasses are fitted, approximating the full correction of the corneal astigmatism both in amount and axis as far as may be without reducing visual acuity (thus slightly overcorrecting the total astigmatism by under-

correcting the lens astigmatism), the patients are made more comfortable, and the lens astigmatism tends to lessen or disappear. If, however, the total astigmatism is corrected, especially when determined without a cycloplegic which tends to reduce lens astigmatism, this change seems less apt to occur, tho the cases so far observed are too few for sound generalization.

A similar condition in which compensatory lens astigmatism distorts the axis of the total astigmatism, is best illustrated by a typical, tho rather unusual, case: A college professor of 55, with one eye amblyopic, is wearing over the other eye +1.D combined with +0.75 Cyl. Ax  $135^\circ$ , with a +2.D added. Retinoscope, trial case, and vision of 20/15 indicate +1.50 combined with +0.75 cyl. ax.  $135^\circ$  for distance, with an addition of +2.25 for close work. The keratometer, however, shows corneal astigmatism of +0.75 Cyl. Ax.  $100^\circ$ , not  $135^\circ$ . He will accept the 0.75 cylinder equally at axis  $135^\circ$  and at axis  $120^\circ$  without reducing vision, but not at axis  $115^\circ$ . The cylinder is therefore ordered at axis  $120^\circ$ , expecting that at the next examination he will accept it at axis  $110^\circ$  and eventually at axis  $100^\circ$ , as the lens astigmatism should disappear when it is no longer needed. Such corrective refraction would have been impossible without the keratometer record.

In a general way, corneal astigmatism is found by repeated examinations over long intervals to be much less variable than lens astigmatism; it is usually also much the largest factor in total astigmatism, when not the only factor; and it frequently determines the axis of the total astigmatism. An accurate keratometer record is therefore a measure of the largest and most stable factor in the total astigmatism, tho other minor and more variable factors are not infrequently present. It is doubtless for this reason that some of those who use the keratometer routinely have observed that those cases in which the cylindrical correction given agrees most closely with that of the corneal astigmatism indicated by the keratometer, are often the cases which wear that correction longest



with satisfaction and without need of change, tho their spherical correction changes with the years. Accurate keratometry is thus almost invaluable, but, like retinoscopy, unless dependably accurate from routine use, it is only confusing.

CONCLUSIONS—1. Reliable keratometers are now available with which corneal astigmatism may be accurately measured in most patients, if precision is acquired by routine practice and by attention to details of technic. Unfamiliarity with the modern instrument, or its insufficient or inexpert use, seems to be responsible for all question as to its practical accuracy, and largely for question as to its value.

2. In that large group of cases where the astigmatism is entirely corneal, its measurement by keratometer and retinoscope should usually be the same. If it is not, the technic of either or both may be at fault, and should be critically examined. The technic of both keratometry and retinoscopy is improved by using each as a check upon the other in such cases; and if this is done without prejudice, the inexpert examiner will sometimes find that not only his keratometry but his retinoscopy is only roughly accurate. The expert should usually be accurate within 0.25 in both, and often within 0.12.

3. In the measurement of astigmatism for prescribing glasses, the routine measurement of the corneal astig-

matism saves time by guiding and so shortening retinoscopic and trial case examinations; and by its check upon them, particularly as to axis, increases accuracy in simple as well as in difficult cases. While cylinders should never be ordered from the keratometric record alone, whenever noncorneal astigmatism can be definitely excluded by careful checking with retinoscope and trial case, a really accurate keratometric measurement of the visual center of the cornea affords a sound basis for which to prescribe cylinders. And when the astigmatism is partly in the lens, accurate measurement of the corneal astigmatism is needed to determine the exact amount of the lens astigmatism, to which different rules of correction may properly apply.

4. In noting changes in the amount and axis of corneal astigmatism at successive examinations, in the early detection of conical cornea, in the measurement of astigmatism after cataract extraction, and in the measurement of irregular astigmatism in the center of the cornea, the keratometer is usually extremely valuable.

5. It would therefore seem that only routine use of the keratometer is likely to be accurate; that this may furnish desirable information, some of which is otherwise unobtainable and some obtainable only with more difficulty; and that it usually saves time and increases accuracy.

*836 Myrtle Ave.*

# NOTES, CASES, INSTRUMENTS

## PERIPHERAL IRIDECTOMY IN THE CATARACT OPERATION.

DR. MARCEL NIDA.

PARIS, FRANCE.

Most of the oculists who extract the lens without its capsule use the combined extraction, with iridectomy, as originated by von Graefe. They obtain



Fig. 1

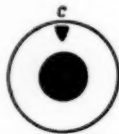


Fig. 2

Fig. 1. Total iridectomy of von Graefe.  
Fig. 2. Peripheral iridectomy of Nida.

after the operation a pupil in the form of a key-hole (Fig. 1). During many years we used this method, but the disadvantages that we observed after the operations i.e. prolapse of the vitreous, incarceration of capsule, small

terior chamber after the rupture of the capsule, or with the extraction of the lens in toto, the hook does not catch easily the pupillary membrane. In the same way when the patient is intractable and does not look well at his feet a large portion of the iris may be drawn outside and such an iridectomy may be total. Consequently an uncontrolled movement of the eye can make the hook stick the posterior face of the cornea or make an iridodialysis.

For these reasons we have given up the hook and constructed a little forceps the form of which is shown in Fig. 3. With this forceps the peripheral iridectomy is very easy to do.

After preparation of the patient and atropin dilatation of the pupil we do the retrobulbar and palpebral injections (five percent novocain solution with adrenalin) and instillations of novocain (two percent) in the conjunctival sac. Then we incise the cor-



Fig. 3. Nida's forceps for peripheral iridectomy.

prolapses of the angles of coloboma in the corneal wound (Fig. 1 a and b) induced me to use a peripheral iridectomy, as small as possible, that we do now in all cases (Fig. 2).

The conservation of the iridic sphincter has been already advocated by a certain number of surgeons, especially Pope, Hess and Pflüger. De Wecker, whose operative ability has remained as a tradition, said that: "This was a difficult technic and that one rarely succeeds in it." Evidently the peripheral iridectomy is almost a sleight of hands, if we use the usual forceps, which are curved so that we can seize the iris membrane as near as possible at the border of the pupil, as far as possible from the limbus. Some ophthalmologists use, instead of the forceps a little hoop: they harpoon the iridic periphery and cut the iris to the level of the hook. Sometimes this proceeding is easy, very often difficult. When the vitreous comes in the an-

nea, incise the capsule, extract the lens, and only at this time we do the peripheral iridectomy. We prefer to end the operation by the iridectomy for the following reasons: If the peripheral iridectomy is made before the extrac-

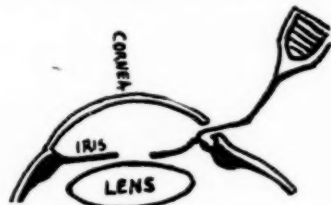


Fig. 4. Forceps seizing iris near its periphery.

tion of the lens, the extraction is sometimes very difficult, because the lens may attempt to pass thru the peripheral iridectomy rather than thru the pupil, especially when its consistency is not firm. The more or less copious hemorrhage produced by the iridectomy prevents the surgeon from seeing the details of the operation.

Some operators have thought that the polycoria gave, after the operation, a monocular diplopia. It is not correct. For many reasons, and especially the superior lid normally covers about one-fifth of the cornea, this second pupil, so small when well done, is even not seen by the patient, or an uninformed physician.

Figure 4 shows the introduction of the forceps into the anterior chamber. The peripheral iridectomy, such as is done by us as often as we operate cataract, has incontestable advantages over the regular iridectomy. Schematically these advantages may be classed as follows:

(1) No incarceration of the capsule, consequently the risks of a bad cicatrization of the corneal wound and of infection are diminished.

(2) No prolapse of the iris as in simple extraction; or of the angles of the coloboma (as in iridectomy of von Graefe), consequently the risks of secondary glaucoma are diminished.

(3) No loss of vitreous when the capsule is perforated or the lens extracted in toto.

(4) Round pupil and better appearance.

#### **METASTATIC PHLEGMONOUS. PANOPHTHALMITIS.**

G. N. BRAZEAU, M.D.

MILWAUKEE, WIS.

This report records a case of the above disease that ran its full course without pain, in spite of great increase of the intraocular pressure. So contrary to our accepted teaching is this fact, that it will not fail to arouse a feeling of doubt in the minds of readers as to the accuracy of the observation. To them, I will say that no one could have experienced more genuine surprise at discovering the fact than I and Drs. F. and W. Newell, the patient's physicians.

The patient, a woman of 46, was recovering from an acute attack of gall-bladder trouble when she was suddenly seized with what appeared to be

septic endocarditis. During convalescence from this, suddenly and during the night, the nurse noticed that the patient's left eye was swelling, so rapidly that by morning the lids were livid and swollen and closed, the eyeball exophthalmic and fixed in the socket and the patient was blind in that eye, tho she did not complain of any pain.

On calling I verified all these facts. The fundus was completely dark to illumination and the tension was very high. The cornea was still transparent. The iris was greenish, the aqueous clouded. To my mind the eye was panophthalmitic. Less than forty-eight hours later the sclera ruptured with evacuation of pus. We were evidently in the presence of a case of septicemia complicated by the aforementioned conditions, septic endocarditis and panophthalmitis. The patient was profoundly prostrated. The temperature oscillated between 100 and 104. After drainage set in, the temperature began to fall and the patient immediately showed signs of improvement.

This was a fulminating case of panophthalmitis in every sense of the word without one of its great characteristics, pain. Painless cases of this disease, that end as this one did, do not belong in the category of this one, nor are they easily confused with it. They are essentially benign in their course, because of the relative benignancy of the products which give rise to them. In them the pus may become encapsulated, or it may be resorbed, with the result that some sight may be retained. There is nothing, however, to prevent their becoming phlegmonous. In such an instance they assume all the grand symptoms of a phlegmon. In this case of septicemia the focus of infection resided in the gallbladder, from whence noxious substances entered the circulation where they attained greater virulence. The infection travels thru the ophthalmic artery to the eye where it sets up a hemorrhagic retinitis with the resulting consequences we have just reported. It was a sad penalty the patient had to pay for this observation.

221 Grand Ave.

# SOCIETY PROCEEDINGS

## COLLEGE OF PHYSICIANS OF PHILADELPHIA,

### Section on Ophthalmology.

February 17, 1927.

DR. EDWARD A. SHUMWAY, Chairman.

#### Normal and Pathologic Anatomy of the Optic Canal in the Roentgeno- gram.

DR. HARRY A. GOALWIN, of New York, pointed out that the opening thru which the optic nerve passes from the chiasm into the orbit, frequently referred to as the optic foramen, has, in most normal skulls, a definite length. It is, therefore, truly a canal. The shape of its cross section is, in most normal skulls, that of a quadrant of a circle, the roof and mesial wall being nearly straight, while the floor and outer wall form the arc. This arc is the mesiosuperior side of the bridge which separates the optic canal from the sphenoidal fissure. The ophthalmic artery, which usually enters the orbit along the floor of the optic canal, has occasionally a separate canal, partial or complete. When this separate canal is incomplete, the two spur like structures which form it should not be mistaken for exostoses. The bridge which separates the optic canal from the sphenoidal fissure (later referred to simply as "the bridge") may also be incomplete, in which case the condition should not be confused with erosion of the bridge. Erosion of the bridge may be from within the optic canal (by an optic nerve tumor) in which case the canal is enlarged, circular or nearly circular, and smooth walled; or from behind, below and temporal (by a pituitary tumor), in which case the tumor is demonstrated in the roentgenograms of the sella turcica.

The average size of the cross section of the optic canal in normal skulls over three years old is 4.1 x 4.5 mm. Differences up to twenty-five per cent are found between the sizes of the two canals of the same individual. The average length of the normal optic canal is 4.3 mm.

In the normal optic canal the pos-

terior margin of the roof lies in front of the posterior margin of the floor. This relation is reversed in certain types of deformed skull, notably oxycephaly, plagiocephaly (oblique skull) and acaphocephaly. In these deformed skulls, the optic canals are also longer than in the normal. The most important change, however, noted in these deformities is the narrowing of one of the diameters of the optic canal and the deformed cross section.

In order to obtain a useful roentgenogram of the optic canal, it is necessary to arrange the tube, head and film in such a way that the central ray coincides with the axis of the optic canal and is perpendicular to the film. In normal adults the axis if directed downward and outward, makes an angle of 38° with the horizontal plane of the head and an angle of 38° with the median vertical plane of the head. In the developmental stage (up to the age of 17 years) this axis varies in its direction according to the age, the exact average for each age being shown in the curves which the speaker has worked out and published elsewhere (*Zeitsch. f. Augenh.*, 1924).

In the deformed skulls there is a change in the direction of this axis.

Pathologic changes of the optic canal may be changes in size, shape of cross section, length, condition of the walls or condition of the lumen. The slides shown illustrate some of the typical pathologic changes. It will be noted that usually changes of several elements are noted; enlargement is associated with change in shape; hyperostosis or exostosis with change in size, etc.

Particular attention was called to the slides which showed how a normal optic canal may appear to be constricted when the roentgenogram is improperly taken. The importance of calculating the actual size of the optic canal from its size on the roentgenogram cannot be overestimated.

*Discussion.* DR. E. P. PENDERGRASS thought that one should be very careful in making interpretations of findings because of the fact that the slightest distortion of the optic canal



can show conditions that closely simulate pathologic conditions. One of the features that should be stressed in the interpretation of lesions of the optic canal is the comparison of the two sides. Demonstration of lesions in the optic canal should be of great value to ophthalmologists, but interpretations should only be made in the light of the most careful correlation of the clinical and roentgenologic examinations. Dr. Goalwin himself has repeatedly experienced great difficulty in demonstrating deformities of the optic canal in his examinations, and Dr. Pendergrass thought the general roentgenologist should only interpret lesions in this region after the most painstaking examination. He thought that some of the conditions, in which Dr. Goalwin demonstrated deformation in the optic canal, could be demonstrated more easily and with a great deal more precision by other methods in general use.

Dr. T. B. HOLLOWAY believed that these studies were not as important in the cases with lesions of the middle fossa where not infrequently the usual roentgen examination and associated clinical symptoms gave valuable information, as in those cases in which the lesions were about the apex of the orbit, such as fracture, accessory sinus disease, periostitis, etc.

Cases of craniostenosis that came under the observation of the ophthalmologist usually presented signs that were almost unmistakable, namely, optic atrophy, exophthalmos, divergent squint and occasionally nystagmus, which are almost invariably associated with facial asymmetry, deflected septum, high arching of the roof of the mouth and a train of other manifestations.

Aside from paying tribute to Dr. Goalwin, his main purpose in arising was to emphasize before the group of roentgen ray men present the importance of this character of study to the clinical type of cases that had been referred to, and he expressed the hope that this technic, altho highly technical, would be made available for the ophthalmologists and others who were most apt to come in contact with such cases.

### Essential Atrophy of the Iris.

Dr. J. MILTON GRISCOM read a paper on this subject published elsewhere in the Journal, p. 647.

*Discussion.* Dr. DESCHWEINITZ stated that altho typical essential progressive atrophy of the iris, with hole formation in its tissue, is not a common affection, its occurrence is evidently more frequent than the literature indicates, in that a number of examples of this variety of atrophy have been observed, but have not been recorded. The left iris appears to be more frequently implicated than the right; rarely, it would seem, both sides are involved.

An essential attribute of this affection is "hole formation"; if there is only atrophy of the anterior layers of the iris, the case does not belong to this group. It is definitely demonstrated that the iris atrophy antedates the establishment of glaucoma. Certainly in characteristic instances of this malady the atrophic process originates the glaucoma, and not the glaucoma the iris atrophy. As the atrophy proceeds, the root of the iris is welded to the periphery of the cornea, a dissemination of pigment occurs, the iris surface available for resorption of the intraocular fluid diminishes, and glaucoma results.

The pigment grains which have been found in the posterior surface of the cornea were first noted by Harms, and are a product of the progressive atrophy, and not due to a low grade iritis.

Dr. Griscom has offered the first satisfactory study of the iris lesions by the slit lamp. In his own case, Dr. deSchweinitz said slit lamp investigations were not available, and when they were the haze in the cornea had so far developed that an investigation of this character was useless.

In spite of Kreiker's interesting suggestion as to the etiology of this affection, quoted by the essayist, it would seem that the true cause of essential progressive atrophy of the iris and the formation of holes in its tissue terminating in glaucoma has not been discovered.

Dr. WM. ZENTMAYER stated that, in

1914, he showed before the Section a case of essential atrophy of the iris which so closely resembled, in history and iris involvement, the case reported by Dr. deSchweinitz a few years later that for a time they thought that they might have seen the same patient until Dr. deSchweinitz noticed that opposite segments of the iris were affected.

In the possible causes enumerated by Dr. Griscom, he mentioned vascular disturbances for which Dr. Zentmayer believed he was responsible, having suggested it as a possibility in his own case. The case, however, was not thoroly studied from the physical standpoint, and, as Dr. deSchweinitz stated in his paper, Dr. Zentmayer failed to assign any cause for the vascular condition.

DR. LUTHER C. PETER put on record an unpublished case similar to that reported by Dr. Griscom, which was under observation in his service at the Polyclinic Hospital.

The reaction of this patient's eye to surgery was very interesting. It was a painful eye, and very hard and red. An effort was made to temporarily reduce the tension by a paracentesis of the anterior chamber. Immediately after the withdrawal of the needle, the blood oozed from all parts of the iris, about half filling the anterior chamber. A second attempt was made to reduce the tension by a posterior sclerotomy. This held for a while, but the increased tension again returned.

The case will be formally placed upon record after the studies have been completed.

#### Ring Scotoma in Glaucoma.

DR. H. MAXWELL LANGDON stated that ring scotoma was first reported by von Graefe in 1858, occurring in two cases of pigmented retinal degeneration. Since then, it has been reported in many other conditions—optic nerve lesions, retinchoroiditis, idiopathic night blindness, migraine after lightning flash, disease of the sphenoidal sinus, after eclipse of sun and after glaucoma.

Attention was called to it as occurring in the last named condition by Bjerrum in 1890, at the International

Congress of Ophthalmology, in his paper on the visual field.

He described a scotoma, always connected with the blind spot, arcuate in form, curving above and below the fixing part, or as occurred in some cases, one such above and another below forming a complete ring. The condition he believed to be one due to pressure on some of the tracts of nerves as they curved over the lips of the cup.

Colonel Elliot agrees with this explanation but thinks that any pathologic condition interfering with definite nerve bundles on or near the disc may leave a similar result, and mentions retrobulbar neuritis, hemorrhagic neuroretinitis and retinchoroiditis juxtapapillaris as examples of this.

Bjerrum has also reported it in a case of embolism of the central artery.

It is not a common manifestation in glaucoma, cases having been reported by Noyes, Mittendorf, Handman, Zentmayer, Posey, Pfluger, Bjerrum and deSchweinitz.

The case here reported is that of Mr. H. W., who was first seen Jan. 15, 1921, his age at that time being seventy-two. His complaint then was discovered to be partially the result of some uncorrected hyperopia and partially of a very advanced arteriosclerosis, the retinal vessels being markedly involved.

He was seen at intervals until March, 1923, when, on account of continued headache, he sought other ophthalmic advice, but returned to the writer in August, 1925. During this interval, among other therapeutic measures, leeches had been applied to the temples at frequent intervals.

The condition which caused his return was a blurring of vision, especially of O. D. which was found on examination to be 5/30, that of O. S. 5/15; changes in the correction improving this to 5/5 and 5/8 respectively. There had been a hemorrhage into the right vitreous and macular changes in O. S. Both improved, sodium iodid being the therapeutic agent, O. D. vitreous becoming quite clear and the punctate hemorrhages of the left macular region absorbing until vision became 5/6 plus and still is so.

On October 16, he complained of heaviness and pressure around O. D. and examination showed a cut in the nasal field and a tension of eighty-five, the tension of O. S. being thirty, and O. S. field full; the pupil of O. D. not being over 3.5 mm. and there being no other objective signs of glaucoma. Pilocarpin, 2 grains to the ounce, was prescribed, one drop four times daily which reduced the tension O. D. to forty and O. S. to twenty-three in forty-eight hours. Two scotomata had appeared in the field of O. D., but central vision was still 5/5. The miotic, pilocarpin, was changed to eserine, gr. one to the ounce, and operation was suggested, the patient being asked to see Dr. deSchweinitz in consultation, for while a trephine was felt to be the safest operative measure, even this was regarded as risky considering the previous hemorrhages and the bad retinal vessels.

Dr. deSchweinitz found conditions as above described, including the partial Bjerrum scotomata; he felt that trephine was the operation of choice but advised continuance of the miotic treatment and frankness with the patient concerning the operative risk. Operation was, and still is, refused by the patient.

Under miotics, the tension fell to twenty-eight in O. D., and twenty in O. S. On November 19, rose to forty-three in O. D. and a ring scotoma, as shown in chart 3, developed; central vision remaining 5/5. The eserine was increased slightly and tension fell to thirty, in which neighborhood it has since remained, varying between twenty-five and thirty-five. Vision has gradually failed in O. D. until it is now about 1/60, but operation will not be permitted as the eye is comfortable and the left is in good condition, tension 18, vision 5/5 and field normal.

The most interesting thing besides the formation of the scotoma seems to be the complete absence of pain and the other complications which are usual with such high tension as existed during the first attack.

It is rather difficult to explain the site of the first part of the Bjerrum scotoma to develop, it being both above and below about equidistant be-

tween the blind spot and the point immediately opposite to it, or almost on the vertical meridian. It would seem that pressure on the bundles of nerves supplying these areas would be more likely to affect the region immediately in the neighborhood of the blind spot or else the whole arcuate area at once.

*Discussion.* DR. G. E. DESCHWEINITZ expressed the opinion that ring scotoma in glaucoma was not a very uncommon visual field defect. He exhibited a number of field charts which indicated that such annular scotomas were formed by the union of inferior and superior Bjerrum scotomas. He showed one visual field chart, the patient being the subject of chronic glaucoma, which portrayed a wide zonular scotoma midway between fixation and the periphery, unconnected with the blind spot. It was possible, he thought, that the scotoma in this case was of retinal origin.

DR. WM. ZENTMAYER recalled the case of J. H., a man 70 years of age, with tension in each eye of 37 mm. Hg. Central vision O. D. 5/15, O. S. 5/6. In each eye there was a deep glaucomatous cup and marked angiosclerosis of the retina.

The fields taken on the perimeter showed the upper nasal field of the right eye almost entirely gone, and also a peripheral contraction, with no color perception. There was a large paracentral scotoma of both eyes, absolute in the right and relative in the left.

The left eye showed, in the peripheral field, a concentric contraction for form and color.

One year later there was in the left eye a ring scotoma of an average width of about 12 degrees, two arcs meeting in a point 15 degrees to the nasal side of fixation.

Two and a half years after this the red field in the left eye was reduced to a hemianopsic area 8 degrees from fixation on the temporal side, and the form field had also become almost hemianopsic. The blind spot was increased about 200%.

At the time of his last visit, in April, 1924, vision was O. D. finger counting, and O. S. 5/6. Tension was O. D. 51, O. S. 45.

DR. LUTHER C. PETER, in answer to Dr. Langdon's question as to the reasons for Bjerrum scotomas appearing above and below the blind spot instead of adjoining the blind spot, pointed out that Dr. Elliot very clearly explains the reasons for the possibility of the Bjerrum scotoma appearing in any part of the field. This same fact was emphasized by Dr. Peter two months ago in a paper before this Section.

The bizarre types of Bjerrum scotoma, as well as the usual forms, depend entirely upon the position and the direction of the development of the cup, due to the strength or weakness of the various zones of the cribriform membrane. The direction of the entrance of the optic nerve into the sclera is a second factor. The scotoma, therefore, may select any bundle of nerve fibers, and the mid-upper and mid-lower temporal quadrants are the bundles which are most frequently affected. In his experience, as stated on previous occasions, the usual Bjerrum scotoma is just as apt to evolve from a point above or below the point of fixation in the field between the tenth and the twentieth degrees, as well as from a point adjoining the blind spot.

#### Linear Precipitates on the Posterior Surface of the Cornea.

DR. LUTHER C. PETER presented notes on a case of bilateral, pigmented precipitates on the posterior surface of the cornea in a woman, 54 years of age, who had hypermetropia. The patient's condition is one of right sided hemiplegia as a result of advanced cardio vascular renal disease. The precipitates on the posterior surface of the cornea are common in a pyramidal zone, especially occupying the lower half of the cornea. Precipitates, however, fusiform in distribution and occupying the center of the pupillary spaces, are unusual.

Vogt, Kruckenberg, and others have observed these precipitates. Some regard them as congenital in origin, others as acquired. Vogt believes that the precipitates occur only in old age, with high myopia, bilateral in distribution, and usually fusiform. He believes them to be acquired.

In the patient presented, fifty-four

years of age can hardly be called senile, and the patient is hypermetropic. The precipitates can be recognized by a +20 sphere in the ophthalmoscope as a dark brown, sharply defined line, occupying the vertical meridian of the cornea. With the slit lamp, this line is observed as fusiform. The precipitates are red, stellate in character, in all probability washed out and scattered over the surface by the aqueous, because the lines do not extend to the limbus from above or below.

The reason for the linear distribution, in all probability, is to be found in the aqueous circulation. One usually observes this circulation to be more active in the mid-zone than in the lateral zones. This is due to the fact that the circulation is more easily recognized in the dark pupillary space; and second, because the entire corneal surface is more remote from the iris, and the temperature probably is considerably lower than in the areas near the limbus.

#### A Case of Unusual Distribution of Opaque Nerve Fibers of the Retina.

DR. H. MAXWELL LANGDON exhibited a patient, Miss M. R., aged 23, who was seen on Dec. 10, 1926, complaining of some headaches and some blurring of vision of the right eye. Vision of the right eye was 5/15 corrected to 5/6 plus. The vision of the left eye was 5/5. There were no external changes. The media were clear in each eye and the right disc was surrounded by large masses of medullated nerve fibers extending about a disc diameter from the disc above, with wing-like projections on each side between three and four times this amount.

There were no other fundus changes in the right eye, and the left fundus was normal. In spite of the subnormal vision, no scotoma covering the part of the field simulating the affected portion of the retina, could be demonstrated, tho this was tried with different illuminations and very small test objects. The only interest in the case is the very wide extent of the involved area.



### Coloboma of the Iris, with Equatorial Punctate Cataract.

DR. SIDNEY L. OLSHO stated that colobomata of the iris are among the most frequent congenital ocular defects. This Section has seen many of them. Cases have been presented by Drs. Oliver, Posey, deSchweinitz, and others. Each additional case, however, has a new fascination that stimulates our curiosity, for their etiology is still speculative and the hypotheses that have been advanced to explain them are only slightly less numerous than the authors presenting the cases.

The fact that most colobomata are situated below gives rise to the idea of incomplete closure of the cleft of the optical vesicle, but their occurrence at other sites seems to dispose of this.

The one mentioned by deSchweinitz is that of Lang and Treacher Collins which is, that there is either an abnormal adhesion between, or late separation of, the lens and cornea, the iris failing to develop in the area involved.

Then there is the one to which Friedenwald gives preference, namely, that there is a possible persistence of the vascular connections which exist in the early embryo between the stroma of the iris and the hyaloid system on the back of the lens, and that, accordingly, the persistence of these vessels inhibits the forward growth of the edge of the optical vesicle, bringing about an indentation.

Posey states that in embryonal life the long and short ciliary arteries normally anastomose to form the circulus major, and that from these further twigs are given off to complete, with their surrounding connective tissue cells, the iris stroma. If there be an absence or anomalous distribution of these vessels, a coloboma develops at the corresponding site.

I do not intend to enter into a discussion of these ideas, but wish simply to present this classical case with attention drawn to any feature that I might think to be unusual.

The patient, Miss A. E., aged 62, was first seen by me in the Eye Department of Jefferson Hospital, Dr. Howard F. Hansell's service, to whom

I am indebted for this privilege.

She came for a new refraction, stating that her left eye had been uncomfortable with the glasses previously prescribed.

The right eye appears to be normal. The pupil measures 4 mm. in moderate illumination and responds to the usual stimuli.

The left eye presents the keyhole pupil characteristic of the condition. There is a coloboma limited to the iris, below and slightly inward. The width of the coloboma at the pupillary border is 3 mm., at the ciliary border 2 mm. The retinal pigment is continued from the pupillary arc along the margins of the pillars of the coloboma as far as the root of the iris. The central portion of the pupil reacts to the various stimuli. The pupils react consensually.

The width of the iris above the upper margin of the right pupil is 3 mm., while the width of the iris above the upper margin of the left pupil is 4 mm. Vision is as follows: R. E. 20/20 corrected, L. E. 20/70 corrected to 20/20.

The form fields presented herewith show, as expected, a fullness of the left field below. In the vertical meridian it extends downward twenty degrees farther than in the same meridian for the right eye.

The ophthalmoscope shows: Right eye, media clear. The fundus is normal. One small cilioretinal artery is present at the temporal edge of the disc. Left eye, the fundus is normal. There is some intertwining of vessels and a deep physiologic cup. The central portion of the pupil presents clear media. The equatorial portion of the lens, starting at the upper limit of the coloboma shows a moderately wide band of diffuse opacity; then a narrow band more clear, and then again a narrow band of increased density.

The dot like character of the central band can be made out ophthalmoscopically.

The case presents an unusual opportunity for slit lamp study of the periphery of the lens.

In the equatorial region below, where the anterior and posterior bands of the peripheral embryonic nucleus join, there is a shower of yellowish-

white rod like and irregularly cuneiform opacities, their general arrangement suggesting a flying wedge with apex downward. Just below this wedge in the adjacent zone of discontinuity the opacities are less numerous; then, farther down where the anterior and posterior bands of the senile nucleus join, there is another less heavy shower of opacities also suggesting a flying wedge.

The slit lamp study seems to verify the ophthalmoscopic appearance of a clearer zone between two denser zones.

Thruout their extent, the senile nuclear bands, both anterior and posterior, present a few punctate opacities and a slight increase in density.

Study of the right lens shows a general increase of density of the anterior and posterior senile nucleus bands.

**William M. Sweet, M. D.**

DR. HOWARD F. HANSELL read a memorial address to Dr. Sweet.

LEIGHTON F. APPLEMAN,  
Clerk.

## MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

### Section of Ophthalmology.

January 14, 1927.

DR. JOHN L. SHELLMAN, President.

### Occluded Pupils.

DR. CARL LARSEN showed two cases of occluded pupil caused by iritis following cataract extraction. There was practically no vision. Pupils were made following the Wheeler technic. In both of these cases excellent pupils were obtained, the vision in one being 20/50 and in the other sufficient for the patient to get around. The visual acuity in the latter case is reduced on account of vitreous changes. These cases have always been a problem, but with the operation of Dr. Wheeler excellent results can usually be obtained. The simplicity of its performance and the lack of trauma make the operation an ideal one. There is, apparently, no hemorrhage from the iris, but in both of these cases there had been slight hemorrhage from the organized exudate.

*Discussion.* DR. FRANK BURCH asked if, for patients requiring iridotomy to form a pupil, where the fibers are drawn up vertically and quite completely, it is not generally better to make an incision across the fibers rather than vertically as in the patients shown. He stated that he had done this many times, using the long narrow Agnew keratome knife used for pterygia, entering the cornea horizontally above and below the proposed new pupil, cutting thru the iris by forcing the point of the knife straight back. This usually results in enough retraction of the iris to get a good open pupil.

Dr. Larsen stated that he had another case which he had wanted to show, a traumatic cataract with occluded pupil, in which he had divided the iris in the horizontal meridian and obtained a perfectly round pupil.

### Sympathetic Ophthalmitis with Autohemic Treatment.

DR. FRED J. PRATT read a letter which he had received from Dr. Wm. A. Fisher of Chicago, on this subject.

*Discussion.* DR. FRANK BURCH stated that he had recently successfully operated on a case of cataract, complicated by sympathetic ophthalmia which had followed a cataract operation on the fellow eye done by a general practitioner. After enucleating the primary eye, foreign protein injections were used (triple typhoid intravenously) with 20 grains of sodium salicylate given intravenously daily between the intervals of triple typhoid injection. This patient had had marked sympathetic iridocyclitis five weeks after her first cataract extraction. She had cataract, marked descemetitis and an adherent, thickened iris. She made a slow recovery; the eye quieted down and at the end of six months was in fair condition. Dr. Burch said he did a preliminary iridectomy, probably too soon. The iris became completely bound to the lens and there was practically no pupil. Following the advice of Dr. Boeckmann, he waited until the eye became entirely quiet. After foreign protein therapy and general tonic treatment, he did a "Wecker" operation, going thru the lens, iris and cor-

nea with one incision, after preparing a Van Lint conjunctival flap. The operation and recovery were uneventful, but it was necessary later to make a new pupil after the method described in the discussion of Dr. Larsen's case above. Vision of 20/65 was obtained and the eye has remained quiet.

Dr. Burch stated that this case is the only one of true sympathetic ophthalmia in which he had succeeded in restoring vision, and he believed the success of the operative measures was aided by the foreign protein therapy which undoubtedly saved this eye. Foreign protein therapy seems to offer the greatest promise of success in the treatment of sympathetic ophthalmia, unless Dr. Fisher's method is still better.

#### **Histopathology of Choroidal Tumors.**

DR. WALTER E. CAMP read a paper on this subject illustrated with numerous lantern slides.

*Discussion.* DR. BURCH said that Fuchs questions whether the matter of pigmentation is really very important from the clinical standpoint. The idea prevails that melanosarcomata have a higher degree of malignancy than leucosarcomata. Dr. Burch asked Dr. Camp whether the belief is general that pigmentation has a bearing on malignancy? Dr. Burch felt that sarcomata of the choroid offer a relatively good prognosis so far as local recurrence and metastasis elsewhere in the body are concerned. In a paper on this subject a few years ago, he believed Dr. Arnold Knapp stated that fifty percent of the cases do well. With the aid from radium and roentgen ray, Dr. Burch felt that one is warranted in holding out to patients a much better prognosis than was possible many years ago. In his own cases of sarcoma, which number twelve in six years, three are now dead. Two of these three had exceedingly marked glaucoma and some local extension at the time of operation. One of these died of metastasis in the liver, another from multiple metastases with a rapid growth occurring in the thyroid gland. In the third case Dr. Burch stated he had no record of postmortem findings, but he believed there was no local re-

currence. In fact, no cases had shown recurrence locally in the orbit.

In this connection Dr. Burch said he would like to relate an experience he had with a patient, aged 67, who came in May or June, 1926, with cataract. She had mature cataract in one eye with no lens opacity in the other. She was sent home without operation. Dr. Burch said that he did not see her at that time but his assistant decided that inasmuch as she had one good eye, the projection being doubtful in the cataractous eye, she should not have her cataract removed. A few months later relatives reported that she was having pain and Dr. Burch asked her to return. He found she had subacute glaucoma, with tension of 46 mm. Hg. Gradle-Schiötz. Preliminary iridectomy and subsequently an intracapsular extraction were done without any difficulty. Five or six days later a tumor was discovered and the eye removed. The sarcoma occupied one-third the vitreous space.

DR. C. W. FOGARTY said that several years ago he sent Dr. Camp an eye which he had enucleated for an intraocular tumor with secondary glaucoma. Dr. Fulton had brought up the point of the relative malignancy of pigmented and unpigmented sarcoma. Dr. Camp's diagnosis in this case was leucosarcoma. This patient died a year later from a metastasis in the abdomen.

DR. J. S. MACNIE said that regarding early diagnosis of sarcoma when associated with a serous detachment of the retina, it is sometimes very difficult to discover the cause of the detachment. A short time ago an elderly man came to the University of Minnesota Dispensary with a history of having had perfect vision the day before but on waking that morning the vision was cloudy. He had a serous detachment of the retina, down and out. The other eye had normal vision and with the ophthalmoscope showed two or three degrees of hyperopia. There was no history of trauma. Transillumination with the means at hand in the dispensary was negative. Dr. Macnie said that a suddenly occurring detachment of the retina in an elderly person, without myopia and without trauma,



must always be regarded with suspicion as possibly being due to an underlying neoplasm. This case disappeared from under Dr. Macnie's care but he learned subsequently that the eye became glaucomatous and cataractous. Someone attempted some form of operative interference for the glaucoma, with disastrous results. Unilateral glaucoma and cataract, the other eye being hyperopic with clear media, should put the operator on his guard. The eye was eventually enucleated and found to have a melanoma.

Dr. Burch exhibited the very excellent volume published by Dr. Herman Knapp in 1869 on "Intraocular Tumors," it being one of Dr. Knapp's first contributions in English soon after he came to New York, and a most interesting and reliable source of information upon this subject today.

Dr. V. J. SCHWARTZ asked Dr. Camp if there were any age preference for the development of intraocular sarcoma?

Dr. CAMP (in closing) said there seems to be a relation between the amount of pigmentation and malignancy. Pathologists think that pigmentation is one of the products of differentiation of the tumor cell. These cells are large, embryonic in type. As the cells mature they become smaller and have larger processes, and begin to develop melanin. It seems to be a natural product of the growth of the cells. Dr. Camp stated one might find one part of the tumor in which there is no pigment and another part which has pigment. They show different pigment production because of the different age of the cells. If that is true, the unpigmented large round fusiform cells would probably be more malignant and give metastases earlier than those that were highly pigmented. Pigment can be looked upon as showing the increased age of the cell, highly developed, and not as malignant as the one which is not so deeply pigmented. The age preference for malignant melanoma is about that for carcinoma. It is very uncommon in young individuals. It has been reported in patients as young as 5 or 6 years. Dr. Camp said he thought Dr. Schwartz had a case about the age of

17, and Dr. Camp believed that was one of the youngest cases seen in the pathologic department of the university. They usually occur about 35 and at any age from that up to 65 or 70. This fitted in with the so-called cancer age.

Dr. Schwartz stated that it had been almost three years now since that section was done in his case. The patient had radium on two occasions. Dr. Schwartz had seen him two days ago, and he was apparently well.

W. E. CAMP,  
Recorder.

### COLORADO OPHTHALMOLOGICAL SOCIETY.

March 19, 1927.

Dr. DAVID STRICKLER, Presiding.

#### Simple Glaucoma — Absolute Glaucoma.

Dr. JOHN A. McCaw showed Mrs. C. C., aged 67. The patient was examined first on June 12, 1918. Vision R. was 5/30, L. light perception; with a plus 2.50 sphere, the R. was improved to 20/20+. In 1912 she had had an acute inflammation in the left eye which began with vertigo, vomiting and severe pain. This was followed by a second attack in which the pain was terrific and which left the eye blind. Examination at the time showed the cornea cloudy, the anterior chamber shallow, the iris atrophic, the lens cataractous. There was no fundus reflex. The picture was that of absolute glaucoma. The tension was 45 mm. of Hg.

The cornea of the right eye was small, about 11 mm. in diameter. It was sensitive and the anterior chamber was relatively shallow. There were no iris changes and the media were clear. There was no cupping of the disc, and no contraction of the field. The tension was 28 mm. Hg. A diagnosis of simple glaucoma was made in the right and absolute glaucoma in the left. Sodium bicarbonate and oxide of magnesium were ordered daily and pilocarpin hydrochloride in 1% solution repeated frequently enough to maintain a contracted pupil. Eserin salicylate was held in reserve to use if pilocarpin



did not control the situation. The patient has followed this treatment for nine years. Since 1922 the central fields have been taken with a campimeter, at regular intervals, vision remains normal with a 2.50 sphere. The tension has risen at times to from 28 to 32 mm. Hg. In 1922 an ulcer of the cornea developed in the blind eye which was enucleated.

#### Simple Glaucoma in Myopia.

DR. JOHN A. McCAW presented Mr. D. M., aged 67, first examined Nov. 30, 1926. Vision R. 20/120; L. 20/120. With correction, R. 20/40; L. 20/80. The patient stated that his vision had been failing for the past year. On arising in the morning, his vision was foggy; as the day advanced, the vision would clear up. He noticed halos at night. The cornea was 12 mm. in diameter and clear, the sensation was diminished, but was not absent. The anterior chambers were shallow and the pupils were moderately dilated. The irides were not markedly atrophic. The media were clear and both optic disc margins cupped. The fields of both eyes were contracted, the left more so than the right. The left field approached the fixation point in the lower nasal quadrant. The tension in each eye was 62 mm. Hg.

With eserine salicylate, 2 grains to the ounce, the tension was reduced to 48 mm. Hg., in both eyes. One week later an Elliot trephine was performed on the left eye with a 1½ mm. trephine. The tension in the left eye dropped to 28 mm. Hg., and has remained at this point continuously, so that the result in this eye has been entirely satisfactory. Vision in the left eye has remained the same. An operation on the right eye was refused.

*Discussion.* DR. WILLIAM H. CRISP complimented Dr. McCaw on his operative result and emphasized that frequently both an operation and miotics are necessary in these cases. He has been interested in the question of miotics and suggested as an attractive field for investigation, the search for a drug to supplant eserine, for use in those patients who do not tolerate it. He reports a case where pilocarpin failed to hold the eye in check and

eserine was resorted to with the result that the eye was red and irritable not from glaucoma, but from the eserine.

DR. E. M. MARBOURG stated that he used eserine once every hour until the pupil was contracted.

DR. WM. C. FINNOFF reported a case of glaucoma of the right eye in myopia. The eye has been under pilocarpin steadily for many years and the tension has remained unchanged. He mentioned a second case which had been under treatment for seven years in which operation was urged at the first examination. The tension, however, has held at 25 mm. Hg., with pilocarpin. One month ago the vision was normal, but on taking the fields, the blind spot was found to be enlarged and the tension was 50 mm. Hg. An Elliot trephine operation was done. The tension dropped and has remained at 30 mm. Hg. Dr. Finnoff congratulated Dr. McCaw on his excellent results, especially on getting the opening well down and a thick conjunctival flap.

DR. JOHN A. McCAW in closing stated that the irritability of eserine must be considered and that he uses zinc sulphate for such irritation. He has never promised anything in an operative way with regard to glaucoma. He always starts with pilocarpin and if the eserine is used, he uses it in the morning early, according to Elliot's teaching.

#### Ocular Pemphigus?

DR. WM. H. CRISP presented a man, aged 70, who for a number of years past had been subject to sluggish attacks of conjunctival and corneal irritation, some times with small shallow ulcerations of the cornea. In the later attacks there had been a tendency for loops of bloodvessels to encroach upon the cornea from several directions. Recent removal of some diseased teeth had not seemed to afford much benefit. A cause for special anxiety was to be found in the recent development of appreciable shortening of the lower cul-de-sac by scar formation in the conjunctiva. Was the condition analogous to pemphigus? There seemed to be a decided amount of nasal obstruction and thickening of the nasal tissue, and

the question of a sinus disturbance was being investigated. Altho this eye had shown a good deal of variation in refraction, the inflammatory disturbance was to a large extent probably independent of refractive error. There were a few changes in the crystalline lens.

*Discussion.* DR. EDWARD JACKSON said the conjunctiva impressed him as one of the chronically thickened type with the possibility of secondary ulcers with recurrences. He thought also of a keratitis rosacea and advised mild digestive treatment and the use of holocain ointment.

DR. W. A. SEDWICK advised the removal of a capped tooth which he had investigated.

DR. E. M. MARBOURG in regard to the removal of teeth, reported that he had had four teeth removed in a case of iritis which had been shown before this Society in October. The result was a violent vitreous hemorrhage with loss of sight. He asked when should teeth be removed and should they be removed one at a time?

DR. WM. H. CRISP in closing stated that the case was one of epidermal pathology and that we see these same vague disturbances elsewhere on the skin surfaces and that in both instances they are due to remote general conditions.

DONALD H. O'ROURKE,  
Secretary.

## BROOKLYN OPHTHALMOLOGICAL SOCIETY.

April 21, 1927.

DR. JAMES H. ANDREW, Presiding.

### Orbital Foreign Body.

DR. ALFRED A. DEYOANNA reported the case of F. M., aged 27, who presented himself Dec. 29, 1926, with marked inflammation of the left eye of ten days' duration, gradually becoming worse. History was of recurrent attacks of inflammation of this eye over a period of four years. Examination showed vision of right eye 20/20, otherwise negative. Left eye showed marked chemosis of the bulbar conjunctiva; upper and lower lids swollen; Fornix of lower lid showed small

black deposit resembling a superficial foreign body of recent origin. Two per cent mercurochrome and 2% butyn were instilled. The deposit in the fornix was found to be adherent and deeply seated. Lateral incisions were made on either side of it and the forceps removed a large mass which resembled a piece of coal. When the mass was shown to the patient, he remembered being struck in the left eye in 1913 with a piece of tinfoil. Uneventful recovery with normal vision followed.

### Herpes Zoster Ophthalmicus with Glaucoma and Iritis.

DR. RALPH I. LLOYD reported the case of Mrs. K., aged 60, who had a herpes of the right supra orbital region and further back on the scalp twelve weeks previously. Six weeks later the eye became involved and cornea at the time of examination was cloudy and uneven. There were circumciliary injection, synechiae and tension of 35 (Schiötz); vision very poor. Pilocarpin solution, eserin and cocain had no effect on the tension. One deep roentgen ray treatment was given with great relief and drop of tension from 35 to 21. Later a blister appeared on the cornea over the pupillary area. It responded to application of moist heat, local antiseptics and protective dressing. On return of the pain, roentgen ray treatment was again instituted. Herpes zoster ophthalmicus; keratitis dendritica; linear keratitis; herpes corneae febrilis; lethargic encephalitis; multiple sclerosis; poliomyelitis; acute myelitis and sympathetic ophthalmia may be proved to be allied conditions which are explained by the spread of an infection along the nerve trunk.

### Acute Bilateral Dacryoadenitis.

DR. JOHN BAILEY reported on a woman, aged 58, who presented herself with a swelling of the lids of the left eye for four days' duration. The accompanying symptoms were severe local pains, chilliness, a moderate rise in temperature and malaise. Vision was not impaired. Examination showed marked swelling and duskeness of the skin of the lids and chemosis of the

bulbar conjunctiva. The eyeball was slightly displaced, down and in, but there was no forward protrusion. There was restriction of motion in all directions because of pain. A definite mass was palpable in the region of the lacrimal glands. The parotid, submaxillary and lingual glands were not involved. At the end of four days, amelioration set in but the right eye became involved the following day. At the end of ten days, convalescence was fully established with no bad after effects.

The condition must be differentiated from orbital cellulitis. The latter, however, is rarely bilateral and there is a greater displacement of the eyeball. The tenderness in orbital cellulitis is more diffuse and there is more tendency to palsy. In dacryoadenitis, fluctuation seldom takes place. Bilateral acute dacryoadenitis should be considered a specific infection due to the organism that is responsible for epidemic parotiditis which usually invades the salivary glands and occasionally the mammae and testes. The lacrimal glands rarely participate in the infection and the incidence of both glands being infected simultaneously is worth reporting.

#### A Study in Tonometry.

DR. JOHN EVANS reported a tonometric study. E. H., 41, female, presented herself with the history of sudden blindness following a stroke, which left her partially paralyzed, three weeks previously. There had been constant frontal headaches ever since. Five years ago she had had salpingitis. There had been eight pregnancies, six resulting in spontaneous miscarriages. Two children were alive and well. She had high blood pressure for which treatment had been received. Examination showed corneae steamy, so that no fundus reflex could be obtained. Pupils were apparently dilated; tension moderately elevated, but there was no congestion, either superficial or deep. First impression was hemorrhagic glaucoma because of the increased blood pressure and the history of having had a stroke. The intraocular ten-

sion was higher than palpation had made it appear and, because of her high blood pressure, the energetic use of miotics and surgical measures were contraindicated. Strong catharsis and sweats were instituted and 450 c.c. of blood withdrawn. This treatment did not have the satisfactory result that was expected of it and the administration of neosalvarsan was decided upon, notwithstanding the presence of albuminuria and casts. This was repeated at various intervals and both eyes were subjected to several operations. The case was observed over a period of two and one-half months, the blood pressure and intraocular pressure being taken daily. The following is a resume of the study:

(1) Injection of salvarsan was followed by marked and rapid drop, not only of intraocular pressure, but also of blood pressure. This was consistent with each injection up to the time operative interference was instituted.

(2) Fluctuation in blood pressure and intraocular pressure seemed to parallel each other.

(3) Intraocular pressure was quite consistently higher in the morning than at night, but the reverse happened occasionally.

(4) Operative interference was not successful in preventing a subsequent rise of pressure. When posterior sclerotomy was performed, there was a gush of from 1 to 2 c.c. of aqueous like fluid which had none of the characteristics of liquid vitreous. This might be interpreted as being a dropsy of the vitreous, as some authors maintain.

(5) When hypertonic salt solution was substituted for neosalvarsan with the idea of producing a lowering of intraocular tension, no effect was noted.

#### Tuberculosis and Sympathetic Ophthalmia of the Eye.

DR. BERNARD SAMUELS, Professor of Ophthalmology at Cornell University, read the paper of the evening on this subject.

WM. F. C. STEINBUGLER,  
Secretary.

## THE MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

May, 1927.

DR. P. M. FARRINGTON, Presiding.

### Primary Optic Atrophy.

DR. A. C. LEWIS reported a case of this trouble in a 45 year old man who had been under active antiluetic treatment for a syphilitic infection acquired four years previously. The vision was 7/200 with the right eye and 5/200 with the left. Increasing doses of strychnin hypodermically and potassium iodid by mouth increased the vision of the right eye to 10/200, but in the meantime the left failed to ability to count fingers at one foot.

*Discussion.* DRS. STANFORD and ELLETT had never seen similar cases improve and thought possibly the seeming improvement was due to increasing familiarity with the test letters.

### Retinal and Subhyaloid Hemorrhages.

DR. STANFORD reported a case in a man, following an injury. The unusual feature was that the hemorrhage apparently covered the disc.

### Alternating Squint.

DR. ELLETT showed a 2½ year old boy with a high degree of alternating squint. Atropin had not influenced it.

*Discussion.* DRS. STANFORD and A. C. LEWIS advised tenotomy.

DR. ANTHONY has success with bilateral resection of the external recti and glasses.

DR. P. M. LEWIS advised operation as he thought glasses would do no good.

DR. ELLETT preferred a stretching operation to advancement.

### Orbital Tumor.

DR. D. H. ANTHONY told of a colored man, aged 66, who without previous eye trouble had noted failing vision and pain in the left eye for two months. For two weeks he had felt a lump in the left orbit and had noted diplopia on looking down. There had also been floating opacities before this eye. Some nasal obstruction had recently occurred.

There was slight left sided exophthalmos; vision of 20/100. The disc

was somewhat swollen and there was a little edema of the lower half of the retina with tortuosity of the vessels in this region. There was slight restriction of ocular movements to the right and left and upward and marked limitation downwards. There was a palpable mass on the floor of the left orbit on the nasal side.

The right eye was normal.

The left nasal wall bulged against the septum and transillumination and roentgen ray showed shadows in the left antrum.

Puncture of left antrum showed the return fluid of irrigation to be very cloudy with thin purulent secretion stained with blood.

A ligation of the left external carotid artery just above the bifurcation had caused a decrease of pain in the orbit and left cheek.

### Cataract with Complication.

DR. ELLETT reported a 44 year old woman who had had a thyroidectomy with possible disturbance of the parathyroids two years before. She had incipient cataracts affecting especially the posterior capsule and cortex. In the right eye there was a small round retinal hemorrhage above the disc. The eyes were about the same except for a slight improvement in the vision in the left eye following a full course of lens antigen administered hypodermically.

In sixteen months the myopia increased from —.75 to —10. sph. in the right eye and from —2. to —10. in the left.

When the vision was reduced to 20/200 with glasses in the right eye and hand motions in the left, a combined extraction was done on the latter and five days later an intracapsular extraction on the former.

Twenty-six days later, vision was O. D. 20/30 partly, O. S. 20/80 with glasses. The poor vision in the left eye was due to secondary cataract, for which a capsulotomy was done on November 6. There was no trouble until November 9, when the eye became painful and the tension rose. On November 12, paracentesis was done on the left eye without effect. The use of adrenalin locally was also without effect on the tension, which was



estimated as + 2 with fingers, but was not taken with the tonometer. On November 15, under local anesthesia, corneal trephine with peripheral iridectomy was done on the left eye up and out. The operation was successful in relieving the tension, but on December 3, when the first careful examination of the eye was made, several small preretinal hemorrhages were found in the neighborhood of the disc and those have not yet entirely disappeared. The vision of the left eye with glasses is now 20/25. The vision of the right eye was 15/15 on January 31, but since then has deteriorated somewhat and is now 20/70. The only things to explain this are some vitreous opacities, apparently not enough to reduce the vision to this extent.

The interesting features in this case are:

1. The possible influence of the disturbance of the parathyroids in causing cataract at the age of 44.
2. The development of the cataract first on the posterior capsule, which is thought to indicate uveal disease, although no other evidence of it was found.
3. The failure of lens antigen to influence the development of the cataract.
4. Occurrence of glaucoma after capsulotomy.
5. The relief of glaucoma by operation.

#### **Tonometers.**

DR. ELLETT reported a number of observations showing the comparative readings of different tonometers on the same eye.

This small series impresses one with the greater accuracy of the original Schiötz over the other models tested.

M. G. SELIGSTEIN,  
Secretary.

### **ROYAL SOCIETY OF MEDICINE. Section of Ophthalmology.**

November 12, 1926.

MR. ERNEST CLARKE, F.R.C.S.,  
President.

#### **Choroiditis at the Macula.**

MR. COLE MARSHALL showed a young woman who, in 1924, came to hospital complaining of a defect in her right

eye, the first manifestation of which was that a needle she was using appeared bent when it was, in fact, straight, and a little later her right vision was interfered with by two spots. A rhinoscopic examination showed there was pus in the right antrum, but at the time she could not be admitted into hospital for operation. In a month the visual acuity had been reduced to 6/60, it having been 6/9 when first the patient was seen. The right maxillary antrum was then operated upon, and following the rather severe hemorrhage, the eye seemed to be considerably upset. Slowly, however, it became quiet, and remained so for 18 months. At the end of that time the patient returned, now with the statement that she saw flashes in her left eye, and two patches of choroiditis were seen in the left macula. Mr. French washed out the antrum, which he found full of pus, and after that the condition cleared up.

*Discussion.* MR. RAYNER BATTEN said the appearances of septic macula were typical only in the early stage. He showed pictures of conditions having some relation with Mr. Marshall's case.

SIR WILLIAM LISTER referred to the case of an officer who, during the war, was shot thru the thigh, and for four years thereafter he had a discharging sinus in the femur. No complaint with regard to the sight was made until an enterprising surgeon decided on excising the sinus and scraping the bone, and this he did and sewed the wound up completely. Four days after this, the patient began to complain of failure of sight. Sir William, on being called to the case, suggested to the surgeon that he had placed a cork in the bottle, and he saw fine changes in both retinæ, at the macula. The surgeon declined to reopen the wound, but three weeks later it opened spontaneously, and fair sight was thereafter recovered, i.e., from 6/24 to 6/9 in one eye, 6/12 to 6/6 in the other.

#### **Coloboma at the Macula.**

MR. MALCOLM L. HEPBURN explained that coloboma really meant mutilation, a term which could be held to include many diseases and abnormalities of

structure at the macula. But the macula was a region, and there could not be a coloboma of a region, there must be a defect of some particular structure. It was properly applicable to gaps in anatomic structures, those in this region being in most cases due to some congenital maldevelopment. The method of formation he must leave to be discussed by embryologists, and he could not claim to be such. He, therefore, discussed the differential diagnosis of various conditions which are found reported under the term coloboma of the choroid at the macula. Only a small amount of material was available for examination, but on the universally accepted facts, he contended that a much more accurate diagnosis than was usual could be made. To speak of degenerations and atrophic patches, without any qualification, was almost offering an insult to the ophthalmic pathologist and his work. And it was most important to strive to the utmost to arrive at a right conclusion in regard to the various diseases and scars of the choroid, as on this depended the advice to be given to the patient. When the vision, especially central vision, was interfered with, two or three questions were usually asked: Was it likely to affect the other eye? Was a recurrence probable? Would the present defect remain permanently? These could not be properly answered, nor a satisfactory treatment adopted, unless the fundus appearances were correctly interpreted. For example, if the condition was inflammatory, quite possibly the other eye would become involved, and an acute choroidal deposit might occur in the same eye, either at a fresh site or in the situation of the old scar. A line of treatment must therefore be entered upon which had as its object the elimination of all sources of infection, and the prevention of further metastatic deposits. But if the condition was a true coloboma, patients could be reassured as the other eye would not be involved, tho the defective vision in the affected eye could not be restored. Such was not a case for any form of treatment. If the condition was a disease of blood vessels which interfered with the due nutri-

tion of the choroid in any fundal region, toxic causes need not be sought, but attention should be directed to the vascular system, in the hope that the nutrition and function of the affected area could be restored. Mr. Hepburn passed to a description of an admitted coloboma in which there was a typical gap in the choroid in the lower part of the fundus, accompanied by a coloboma of the iris in the same situation. There was found to be a large pearly white area with a well defined border, edged by a narrow band of pigment, which showed where the choroid ceased. No pigment proliferation could anywhere be seen, and the only vessels crossing the gap were one or two atypical ones. Any supposed coloboma of the choroid must, to deserve the name, conform with this description. The paper was illustrated by a series of drawings, shown by the epidiascope.

*Discussion.* MR. RAYNER BATTEN showed a series of drawings of the condition also, and demonstrated them on the screen.

MISS IDA C. MANN entered upon an exhaustive examination of the various views which had been advanced at different times to explain the occurrence of these colobomata. She said there were three main types: (1) those with heaped up pigment. These were characterized by a round or oval patch in the central region, and often retinal vessels ran over the patch, showing that it was deep. Large choroidal vessels could sometimes be seen under the pigment. The choriocapillaris layer was absent. (2) This showed punched out holes, with a narrow ring of pigment with a pearly white base. The base of the patch might be ectatic. (3) The type associated with some abnormal vessels.

Miss Mann said the various theories which might be advanced could be arranged under five heads. The first was that it was a true coloboma, due to a developmental anomaly in the growth of the optic cup. The second class held that it was due to an anomaly of differentiation of certain cells. The third was that it was caused by intra-uterine inflammation of the choroid. The fourth theory was that it was the result of interpartum retinal or cho-

roidal hemorrhage, and fifthly, it was held that in some of the cases the cause was an inflammatory condition occurring in early infancy. Each of these she examined at length, leaning herself, to the third, and she proceeded to sketch the development of the eye in other mammals.

MR. R. C. DAVENPORT exhibited two patients from his clinic under Mr. J. H. Fisher, who were typical of two of the types which Miss Mann had referred to.

SIR WILLIAM LISTER showed the pictures of a case which strongly suggested that the condition was of inflammatory origin. The disc was swollen and the edge blurred, while white lines ran along the course of the vessels. Both eyes were affected.

MR. TREACHER COLLINS, in a number of instructive slides, traced the sequential stages in the development of the eye, and commented on the various views which had been advanced.

THE PRESIDENT showed pictures of and described a case which he had

watched thirty years. As a baby, that patient had coloboma at the macula, in both eyes. He had passed thru Harrow School, and had taken his degree at Cambridge, and had been able to participate in sport. But he did not look at one directly. This young man had had several defects, such as undescended testes and a defective facial bone, as well as horizontal nystagmus as a baby.

MR. AFFLECK GREEVES said he had always regarded coloboma at the macula as of inflammatory origin; the heaping up of pigment was difficult of explanation on any other ground. The defect was obviously one of the meso-blast, not in the optic cup. In the prenatal cases there was generally some ectasia, while in the postnatal ones the areas were flat.

MR. HARRISON BUTLER described a case of his own, and Mr. Hepburn, in a brief reply, urged the adoption of a more exact nomenclature.

H. DICKINSON,  
Reporter.

### REESTABLISHMENT OF INTERNATIONAL CONGRESSES.

THE CONVENTION OF ENGLISH SPEAKING OPHTHALMOLOGISTS, held in London, July, 1925, authorized its President, Mr. E. Treacher Collins, to nominate a committee to take into consideration plans for the renewal of International Ophthalmological Congresses, whose periodic sessions had been interrupted by the War.

To this end Mr. Collins appointed Sir John Parsons, Mr. Leslie Paton, Dr. Edward Jackson and Dr. G. E. de Schweinitz. Their labors, covering a period of two years, eventuated in a Conference which took place at Scheveningen July 12-15, 1927, and which was attended by forty-eight delegates, representing twenty-five nationalities, as follows:

#### Argentina—

Prof. Demaria  
Prof. Arganaraz

#### Austria—

Dr. A. Fuchs  
Prof. Lindner.

#### Belgium

Prof. Coppez  
Dr. Weekers

#### Chile—

Dr. Thierry

#### Czecho-Slovakia—

Prof. Elschnig  
Prof. Leser

#### Denmark—

Prof. Lundsgaard  
Dr. Bentzen

#### Egypt—

Dr. Riad  
Dr. Meyerhoff

#### England—

Mr. E. T. Collins, Convener  
Sir John H. Parsons  
Mr. Leslie Paton

#### Finland—

Prof. Gronholm

#### France—

Dr. Morax  
Prof. Terrien

#### Germany—

Geheimrath Prof. Axenfeld  
Prof. Wessely

#### Hungary—

Prof. de Grosz  
Prof. de Blaskovics

#### Italy—

Prof. Ovio  
Prof. Roselli

- Japan—  
 Prof. Dr. Bumpei Hata  
 Lt. Comm. Sukezo Tagawa
- Mexico—  
 Dr. Velez
- Netherlands—  
 Prof. Rochat  
 Prof. van der Hoeve  
 Dr. Marx (Secretary)
- Norway—  
 Prof. Hagen  
 Dr. Malling
- Poland—  
 Prof. Szymanski  
 Prof. Kapuscinski
- Portugal—  
 Dr. Borges de Sousa
- Roumania—  
 Dr. Pandelescu  
 Dr. Kasvan
- Spain—  
 Dr. Marquez  
 Dr. Poyales
- Sweden—  
 Prof. Albin Dalen  
 Prof. Fritz Ask
- Switzerland—  
 Prof. Gonin  
 Dr. Pflüger
- United States—  
 Dr. G. E. de Schweinitz  
 Dr. Walter R. Parker

On Tuesday, the 12th of July, a preliminary meeting was held. Prof. Rochat delivered a graceful address of welcome, speaking fluently in English, French, German and Italian.

The Convener, Mr. E. Treacher Collins, followed with a highly interesting history of previous International Ophthalmological Congresses. At its conclusion he moved that Prof. van der Hoeve should take the Chair, and that Mr. Leslie Paton of London, Dr. Marx of Leiden, and Dr. Pflüger of Berne should be nominated as Secretaries. These nominations were unanimously accepted.

The principal motion, "That the International Congress of Ophthalmology be reconstituted," was carried by acclamation, and four committees were appointed—A. to consider Rules and By-laws, B. to consider the date and place of the first meeting of the New Congress and the subjects for dis-

cussion, C. to consider the question of Finance, and D. to consider what questions of International Ophthalmological Importance should be remitted to the Council for discussion.

On the evening of Tuesday, the Anglo-American Convening Committees entertained the Delegates at dinner at the Palace Hotel.

On Wednesday, the 13th, the Committee met in the morning, and the reports were ready before eleven o'clock. In the afternoon, the members of the Conference were the guests of Prof. van der Hoeve in an excursion by car and steamer to Leiden and the neighboring lake district. In the evening, Mr. and Mrs. Van der Bergh entertained the delegates at dinner and at a garden party in their beautiful place at Wassenaar near The Hague.

The following paragraphs are quoted, by permission, from Mr. Paton's records:

"On Thursday morning, July 14th, the reports of the Committees were received. Invitations had been received from Denmark, Egypt and Holland for the first Congress and from Madrid for the second Congress. It was unanimously decided that the first Congress should be held at Amsterdam in September, 1929. The new Rules and By-laws were unanimously adopted by the Conference. The subscription was fixed at two pounds sterling, or an equivalent sum, for members and one pound for associates.

"Apart from the expenses of the Congress itself, a fund will be required to meet the expenses of the International Council, which will hold office in the period intervening between the Congresses. Already a certain amount of expense had been incurred in preparation for this Conference. To meet these and other Council expenditures it was resolved to ask for voluntary subscriptions of not more than five pounds, or less than two pounds, from Ophthalmological or other Medical Societies, or from individuals. Any Society subscribing will be entitled to receive a copy of the Transactions of the Congress for its Library. In this way, it is hoped to secure a sum sufficient to meet the expenses of the Council, other



than those directly connected with the Congress.

"The management and finances of the Congress itself will be controlled by a National Committee, elected by the Ophthalmologists of the country in which the Congress is to be held, and working in conjunction with the International Council.

"It was remitted to the Council to decide on the subjects for discussion, both at the Congress and by special committees to be appointed by the Council.

"An International Council was then appointed, to hold office until the Congress of 1929. It consists of Prof. van der Hoeve (Netherlands), Chairman; Prof. Lundsgaard (Denmark), Vice-Chairman; Mr. Leslie Paton (Gt. Britain), Treasurer; Dr. Marx (Netherlands), Secretary; Geheimrath Prof. Axenfeld (Germany); Dr. Byers (Canada); Prof. Coppez (Belgium); Prof. Marquez (Spain); Prof. Meller (Austria); Dr. Morax (France); Prof. Ovio (Italy); and Dr. de Schweinitz (United States). As the concluding act of the Conference, Mr. E. Treacher Collins was elected Honorary President of the International Council by acclamation, and as a tribute to all the work he had done toward ensuring the success of the Conference and the future of International Ophthalmology.

"After the conclusion of the formal business of the Congress, the delegates were taken by cars to Nordwyk-on-Sea, where they were entertained at lunch-

eon by Prof. van der Hoeve, whose health was proposed in eloquent Latin by Prof. Ask, backed up in English by Dr. de Schweinitz, in German by Geh. Prof. Axenfeld, in English by Prof. Arganaraz, in Italian by Prof. Ovio and in French by Dr. Velez. After lunch the delegates visited the palatial new Ophthalmic Clinic at Leiden and greatly admired the spacious rooms and accommodation provided there for ophthalmological work."

Thus ended this Conference, notable in friendliness, cooperation and achievement. All delegates worked toward a common end, which was attained, "in perfect sympathy and uncontending equity."

For two years, the English members of the Anglo-American Committee have labored insistently. The chief duties were performed by Mr. Collins and Mr. Leslie Paton, cheerfully and with fidelity. Ophthalmologists, here and abroad, are deeply in their debt.

The hospitality of Holland was more than generous. Professor van der Hoeve's preliminary work on the Continent was of the highest importance. His parliamentary skill as Presiding Officer, his ceaseless energy, his personal charm, and his utter friendliness were potent factors in the success which has been achieved.

A noteworthy feature was the fine spirit of loyalty to the desired object—the Renewal of International Ophthalmological Congresses—portrayed by all the delegates.

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## STERILIZATION OF THE UNFIT.

In a recent issue, the daily press carried the statement that the Virginia law providing for the sterilization of mental defectives has been declared constitutional, one judge dissenting. The quoted opinion states that the principle covering compulsory vaccination is broad enough to justify sterilization. It further says "that it is better for all the world if 'society can prevent those who are manifestly unfit from continuing their kind.' The operation of salpingectomy was ordered by a lower court, which order was upheld.

The editorial comments have been very favorable to the law, stating that it would be applied only to those manifestly unfit. It would seem a far cry from mental states to ocular conditions, and that the members of our branch of the medical profession are only academically interested in the decision. However, if the above is carefully read, it will be seen that we are not so uninformed as at first appears.

Before coming to this phase of the question, it should be noted that the operation ordered, salpingectomy, is not entirely devoid of danger. Are there not other methods, such as the use of the X-ray, which would accomplish the same result with a less degree of danger? Secondly, in view of the great advances in medicine, can we

say that imbecility, etc., are permanent pathologic states—as permanent as the state caused by a salpingectomy? The word "incurable" is being more and more restricted in its medical application, and who shall say where this progress will stop?

Returning to the subject, it will be seen that the principle of compulsory sterilization is held to be an extension of the principle of compulsory vaccination. The lay mind is sometimes at a loss to understand the intricacies of legal decisions, and to the writer this would seem to be a procrustean act. Smallpox is a contagious disease, causing loss of life, pain, blindness, etc., to whole communities, which can be prevented at the cost of a few days' local inflammation of the arm. Imbecility threatens at the most a few—the descendants of the affected person. If this principle of extension is logically carried out, why not a law compelling every one to have his eyes tested for glasses, or his tonsils removed? Both are well recognized health measures, which at present are left to the good sense of our fellowmen. Yet, when we consider the present status of the invasion of the private rights of the individual by the State, who can say when a band of fanatics will have such laws passed? And others, which may not have so solid a foundation of reason! Have laws been so brilliantly success-

ful in making mankind morally perfect that we should welcome legal genetics?

The opinion deals with those who are "manifestly unfit to continue their kind." This evidently means those who are pathologically subnormal. If it can be applied to those who are mentally subnormal, why can it not be extended to those who are physically subnormal? Oculists deal with several hereditary conditions which frequently are incurable (so far at least), and which render the individuals charges upon the State. Of these, cataract, glaucoma and retinitis pigmentosa are perhaps the most important. We know that cataract patients do not always obtain serviceable vision following operation, however well performed. We know that glaucoma frequently goes on to blindness, in spite of our best efforts. We know the hopeless prognosis of retinitis pigmentosa. Are we therefore justified in demanding sterilization in such cases? Of course not, and yet an imbecile is hardly more socially dependent than is a blind man. Logically, the latter is as much of a menace from an hereditary standpoint as an imbecile. We know too little about the underlying factors of heredity to embody them in the law of the land. Sterilization is simple—but irrevocable. It will stop one line of descent, but leaves all others unaffected. The proper method of attack is a more intensified study of disease and heredity.

The time to attack a bad law is before it is passed, and medical men should be on the alert to prevent their garbled opinions from being used as data for the enactment of such laws. If we desire to protect the blind, the time to fight is when laws are proposed whose extensions may involve the blind. Nothing can be done in Virginia, but the medical profession of other states may, by its vigilance, prevent the enactment of laws whose far-reaching results cannot be foretold.

C. L.

### EYE PHYSICIANS.

When the Guild of Dispensing Opticians (see p. 633) was formed in Philadelphia, its members soon real-

ized that if they were to stay in the business in selling spectacles, on physicians' prescriptions only, they must have some way of bringing their business before the public. The skill claimed by the professional optometrist was being emphasized in the daily papers by shrewd business agents. The advertisements of "Eyes examined free" drew people to certain opticians, who would sell spectacles without a prescription, or who would direct them to the offices of oculists with whom they exchanged favors.

The dispensing optician started a campaign of advertising to impress on the public the idea that the best way to get the right glasses was to go to a physician and get a prescription for them, and take it to a dispensing optician to get the glasses: as people have been educated to do when drugs are needed. The attempt to teach this plan soon showed the difficulty of making the public understand whom they should go to. To send everybody to Dr. Smith who sent all his patients to them was simple. But to make the public understand who were reputable oculists, in good standing in the medical profession, was very difficult.

Ophthalmologist, oculist, optometrist, eye specialist and optician are terms about which the public has very hazy notions. They all seem to have something to do with eyes and glasses, and the use of such terms did not help them to take the course advised. The word doctor was no better. Each optometrist wants his "patient" to call him "Doctor." In every large city are schools of optometry, legally granting the degrees "Doctor of Optometry," or "Doctor of Optics," after residence of from a week to a year, or upon a widely advertised "correspondence course."

It was a happy suggestion that these opticians adopted, to advise the public to consult "eye physicians." The word physician has a definite meaning in the minds of most people. It is associated with health matters, a medical education and membership in a real profession, not a profession created by legal enactment to meet the advertising needs of up to date business men. The optometrist could not confuse the public as to the meaning of physician.

The department stores saw that advertising an "eye physician" to give advice to their customers was coming unpleasantly near to association with the advertising medical quacks. It could not be used to confuse the public to the advertiser's advantage. An eye physician, a real physician who had special knowledge of the health needs of the eye, was a person the advertisers had no use for.

The term "eye physician" may well be a subject for special thought, on the part of every physician wishing to prepare for and establish himself in ophthalmic practice. He may desire to be so designated and may be proud to deserve the title. It suggests the broad medical and health responsibilities that rest upon every physician. It should divert the emphasis that has come to be placed on the importance of the operative surgery of the eye, to the wider, more important aspects of eye health: and to the close vital relations between eye fatigue and nerve fatigue, between eye nutrition and general nutrition, between eye health and general health.

E. J.

### JOURNAL ILLUSTRATIONS.

In a journal like this illustrations are used to help the reader understand clearly the thoughts and suggestions of the writers with the least uncertainty or unnecessary effort. Properly prepared, they do this better and in less space than would be possible by depending wholly on printed descriptions. But they must be prepared with the main purpose constantly in view, and with an understanding of the limitations which the size and manner of printing of the journal impose.

A journal article cannot be a complete encyclopedia. Neither can a picture to illustrate the report of a case of tumor of the eyelid give a complete view of the anatomy of the head, with the operator and his assistants and the operating table thrown in for good measure. Every unnecessary line or object simply detracts from the main idea to be conveyed by the illustration; and tends to conceal it, or at least lessen the force and clearness with which it is presented.

The reader who does little work in histopathology is more confused than assisted by a microphotograph that shows ten times as much normal tissue as it does of the particular lesion it was hoped to indicate. If one is not a radiographer a radiogram of the whole head is more likely to turn the reader's attention to several other things, rather than to the size of the pituitary fossa that it was intended to show.

Ocular structures, or details of the small instruments used in operating on the eye, in order to be seen easily and clearly, may need to be magnified rather than reduced. But if a picture is too large for the page, or the column in which it should be placed, it must be reduced; either by cutting out the unimportant parts, showing operator's hands or nurse's faces, or by reducing the scale of the whole picture and thus concealing the essential details that should be made prominent.

Pictures prepared to pass around at a meeting, or to hold up before a class to be seen several feet away, are always unsuitable for reproduction as journal illustrations, until they are reduced in scale or have the unessential portions cut away.

A common way to waste space that is needed in a picture for really important things is to indicate important points by letters placed around the picture; with an unnecessary space between the letters and the picture; or to have two or more views on the same card, so far apart that waste paper is left between. Many times such thoughtless arrangements must be corrected, by cutting the picture into pieces and bringing the essential parts within the space available by cutting out the waste paper, or by making the pictures so much smaller, that they will not show the points that require the illustration.

It would help the intention of the writer, increase the effect of the article, improve the quality of the journal, and save the time and temper of the editor, to bear in mind the conditions of reproduction when pictures are prepared for journal reproduction. These are:

The size of the printed page. That unimportant things reduce the space for those that are important, and with



waste paper reduce the scale on which the important things can be shown. That X-ray films should not be sent; but a good print of the part of essential interest is the only thing that should be used for an illustration. That a photograph of the whole face and figure of the patient is no help to show the exact character of a lesion, confined to the eyeball, or lids. That the various color fields cannot be reproduced in colors, but can be best illustrated by solid, dotted and broken lines. That pictures of new instruments should show the new feature distinctly, not reduced to make room for handles and accessory parts, that they have in common with all other instruments of their class.

These characteristics of a good illustration are only secured by giving them as much thought and care as is given to the selection of matter and shaping of the sentences for the text. E. J.

### BOOK NOTICES

**Festschrift Herrn Geheimrat Professor Dr. Th. Axenfeld**, *Klinische Monatsblätter für Augenheilkunde*, 78 Band Beilageheft, Edited by Prof. Dr. W. Stock. Paper, 250 pages, Frontispiece, 4 colored plates and 101 text illustrations. Stuttgart, Ferdinand Enke.

This volume is to celebrate Prof. Axenfeld's sixtieth birthday, and it is in several respects a notable one. The first paper is contributed by his co-editor and former chief, Prof. W. Uthoff of Breslau, whose death at the age of 74 was announced two months ago. It contains 41 pages from authors of high scientific standing, who live in Germany and 11 other countries, viz.: Sweden, Russia, Norway 2, Finland, Bulgaria, Spain, Italy 2, Checko-Slovakia 3, United States 2, Austria, Switzerland 2, and Denmark. The fact that Prof. Stock has brought together from neutral countries and some opposed to Germany in the World War, tributes to this common teacher of ophthalmology, is a good omen for the reestablishment of The International Congress of Ophthalmology.

These papers will be noted in their

appropriate divisions of Current Literature. Among German publications this volume is notable in the particular character of the communications it contains; altho laboratory investigations are also well represented. Of the illustrations 54 present histology and pathologic conditions, 18 represent clinical cases, 16 are graphs and charts of visual fields and 3 illustrate instruments. The frontispiece is a fine reproduction of an expressive photograph of Prof. Axenfeld. Of the colored plates one illustrates the glycogen content of the retina and its relation to the contraction of the rods; one shows the histopathology of a metastatic hypernephroma, one the clinical appearances of a case of induration of the conjunctiva and one of symmetric iris atrophy.

Such a tribute to commemorate a sixtieth birthday is a pleasant departure from the custom commemorating the birthday ten years later; and is particularly appropriate to one who commenced his valuable services of writing and teaching earlier in life than many who have attained eminence in ophthalmology.

E. J.

**Société Française d'Ophthalmologie. Bulletins et Mémoires**, 1926. Paper, Royal 8vo, 432 pages, 4 plates in colors and 48 illustrations in the text. Published by a Committee for the Société. Paris: Masson et Cie, 1927.

The Société Française is the French-speaking ophthalmic gathering of the world. Its international character is emphasized by its membership of 780, drawn from France, 6 French colonies and 41 other countries; the 22 foreign delegates present at this meeting; and still more emphatically by those who presided at its sessions, Dupuy-Dutemps of Paris, Patry of Switzerland, Danis of Belgium, Grignolo of Italy, and Poyales of Spain. In its list of dead, with Landolt and three confreres from France, are named; Critchett of London, Denhaene of Brussels, Sarnecki of Poland, and Ziegler of Philadelphia. The 102 new members, admitted at the meeting from 16 different

countries are many of them already of international reputation, and will help to sustain the high reputation built up by this organization, in its 40 years of scientific activity.

The things which interest ophthalmologists are much the same thruout the world. This is illustrated in 46 papers and the discussions of them that occupy the bulk of this volume. The leading report deals with lesions of the cornea, as studied by means of biomicroscopy. This report was presented by Gallemaerts of Brussels, and was prepared by Jeandelize and Bretagne of Nancy and Hambresin of Brussels. It deals chiefly with hereditary and familial keratitis and focal degenerations of the cornea; but other lesions were considered, especially in the general discussion that followed.

This report constitutes the first part of an atlas on Ocular Biomicroscopy, and specimens were presented to members of the Société. Two colored plates belonging to it carry interesting illustrations of such lesions; which are particularly favorable for biomicroscopic investigation, because they present marked opacities surrounded by relatively transparent cornea. Among the 46 papers included in this volume, and listed in Current Literature under the appropriate headings, are some of especial interest and importance. One by Coppez and Danis, on Senile, Exudative, Macular and Circinate Retinitis, is significant, as linking together two sets of fundus changes that have usually been discussed apart. It is illustrated by two colored plates, illustrating the ophthalmoscopic appearances.

The Société Française is to be congratulated on the value and interest of its proceedings, and the wide and strong scientific support that is being drawn to it. E. J.

**La Tuberculosis en los Ojos.** Dr. L. Lijo Pavia, Buenos Aires. Paper, 190 pages, 41 illustrations, 9 colored plates. Buenos Aires, 1926.

This monograph on ocular tuberculosis, and its forms, diagnosis and treatment, seems to be based on clinical

cases, more than 40 of which are reported in abstract with clinical studies including biomicroscopy with the Czapski microscope and bitumi and slit lamp, and with numerous histologic examinations of tissues.

The work is divided into five chapters which each treat of a particular tissue, thus: I, Tuberculosis of the palpebral conjunctiva and tarsus. II, Bulbar conjunctiva and sclera. III, Tuberculosis of the cornea. IV, Uveal tuberculosis, under Anterior Uveitis and Choroiditis. Chapter V is devoted to the diagnosis and treatment. The diagnosis is microscopic including examination of tissue, cultures, inoculation, and biologic reactions. The treatment is based on the use of tuberculin; and a table of doses is given.

The illustrations in the text are largely of histologic appearances. The plates show corneal and epibulbar lesions; and ophthalmoscopic pictures of the fundus, by ordinary and red free light in a case of choroidal tuberculosis. There is a bibliography of 113 references. Naturally the literature all dates within the last sixty years and the majority of the papers have been published within the last fifteen years. American papers are well represented, about one-fifth of the whole list.

This book is a real contribution to the literature of ocular tuberculosis. It should be consulted by any one who hereafter attempts to write upon this subject. E. J.

**Diseases of the Human Eye, by Martin Cohen, M.D.**

Ophthalmologic illustrations are always welcome. These, being prepared from actual cases under Dr. Martin Cohen's personal directions and observation of patients, are very well done and are particularly well selected for a teaching series. The reproduction by the four color process is reasonably good. They embrace twenty-four subjects showing diseases of the eye, the diagnoses being given.

The illustrations are views as seen by the modified May ophthalmoscope, with the focal illuminator and the hand slit lamp. The reviewer has as much satisfaction with the hand slit lamp as

he has had with the larger one; the examination with the hand lamp consuming but a fraction of the time required for the larger magnifier. The illustrations are accompanied by an index describing the pictures and the cases, and also hints on the use of the modified May ophthalmoscope and the slit lamp. H. V. W.

**Das Augre. Seine Schädigungen, ihre Verhütung und Bekämpfung.** Prof. Dr. Viktor Hanke. Paper 8vo, 134 pages, 38 illustrations, some in colors. Vienna, Julius Springer, 1927.

This condensed, well written book is written as a guide to teachers, parents and educators, who need information on the possible impairments of the eye, and their prevention and management. The successive parts take up I, The Anatomy of the Eye, 16 pages; II, The Functions of the Eye, 20 pages; these two parts contain nearly all the illustrations. III, deals with Becoming Blind, 25 pages; IV, Means to Prevent Blindness, 22 pages; V, Hygiene of the Eye, 14 pages; VI, Occupational Choice for the Blind, 11 pages; VII, Occupational Diseases, 7 pages, and VIII, Special Schools for Those with Weak Sight, 5 pages. In brief this brings together details of the anatomy and physiology of the eye and the dangers to the eye that have the most practical bearing on its hygiene.

In the list of those to whom this treatise was addressed might well have been included those who have the care of the blind, or who have in the blind a humanitarian interest. Not since Prof. Fuchs' little book on the causes of blindness has there been published a medical book of more practical interest to this class of readers. The list of occupations in which the blind can work to support themselves and render efficient service to the community occupies 7 pages.

In all directions the selection of material for the purpose of this book, its arrangement and manner of presenting the facts are admirable. Its outstanding character is the absence of what would serve chiefly to swell its bulk or give it a more imposing ap-

pearance. This is a virtue in books that is too rare and too rarely recognized. The illustrations include a representation in colors of the ocular fundus; and a diagram of the visual pathways from the eye to the visual cortex. But even in these there is no parade of detail that would be confusing rather than helpful. E. J.

**Psychologie der Bewegungen Konfiguration und Farben unterverwendung des Flimmer Phaenomens.** Dr. Kurt Haack. Paper, 8vo, 268 pages, 17 illustrations. Berlin: S. Karger, 1927. 21 Marks.

This book describes attempts to reproduce by experiment, and to study the psychology of movements, forms and colors as seen in scintillating scotoma. It is one of a series of books on psychology traceable to the influence of Dr. R. H. Goldschmidt, professor of psychology in the University of Münster. The experiments were designed to produce, by means of rapidly rotated discs used singly and in combinations, sensory impressions resembling the subjective phenomena of ophthalmic migraine.

It is manifestly an effort to bring physiologic optics into service in the definition and statement of problems in psychology. But the physiologist may find in it statements and points of view, which will help toward solution of his own problems, and the reading ophthalmologist may find presentation if not full explanation of one of the most striking and impressive visual symptoms; often alarming when encountered for the first time and always interesting. But the center of this mystery, the etiologic mechanism that gives rise to an attack of the "dazzles" remains obscure.

The headings under which the subjective matter is arranged, give an indication of what the writer has thought most important in his observations and reflections upon them. I, The nature and arrangement of the problem, 10 pages; II, A description of the phenomena, 19 pages; III, The phenomena of movement, 62 pages; IV, Forms, apparent figures and bodies, 90 pages; V, The color phe-

nomena, 69 pages. A bibliography of 6 pages is appended, indicating how much has been written on this subject in the last century and especially in the last 60 years. This literature does not go back to Hippocrates and Galen; but begins with Leonardo de Vinci, Müller and Plateau. For a scientific understanding of scintillating scotoma we must still look to the future; but some exploration has been done with regard to it that may suggest directions for further advances. E. J.

**Chirurgie de l'Oeil.** F. Terrien, Professor in the Faculty of Medicine of Paris, Ophthalmologist to the Beaujon Hospital. Third edition, one volume, 648 pages, 565 illustrations. 100 francs.

We had the pleasure and profit of reading the first edition of Terrien on *Surgery of the Eye* in 1902, and a second in 1921. In this third edition the author has revised his material, eliminating that which was tried and found wanting; substituting therefore more modern modes, the results of the last decade; yet not going into all professional methods or those of but passing interest; describing herein the operations as done by him and his assistants.

Applying thruout the principle of free illustrations, he places his pictures in his text in propinquity to the subjects. There are 75 new figures in this edition; noteworthy among which are those showing the keratome incision for extraction of cataract; the Smith and Barraquer operations; transfixion of the iris; dacryocystorhinostomy, operations for ptosis and trepanation of the sphenoid.

The subjects are taken up and described in anatomic order. After consideration of the surgical anatomy of the ocular structure under discussion, he gives the precautions to be taken before any surgical intervention. The current forms of operations, with critiques and selections of the most practicable, are described. The indications for operations are given, with the complications that may occur in the after period.

Operations are described in detail, so that the exact sequence of the various steps of the procedures is

brought to the mind's eye. Particularly for the cataract operation is the detail most minute, showing by picture and by words the exact positions and movements of the operator, his assistant, the holding of the head, the fixation of the globe, the technic of the incision, the delivery of the lens, the after dressing and the precautions for each procedure. The work is a complete and trustworthy feature on ocular surgery, and is most highly commended.

While his illustrations are artistically a success, yet in some instances, as those dealing with the "Smith" operation for cataract and the "Elliot" trephining for glaucoma, it were perhaps better if the author would picture the most modern improvements and instruments; for here he shows no personal familiarity with these operations; nor are the typical operations as done by Americans much in evidence, the French procedures usually being credited. Be this as it may, the book is more exhaustive than any in the English language, quite "Teutonic" in detail. The reviewer again calls attention to the high class output of French ophthalmologists since the World War, taking the place in literature formerly held by the Germans.

H. V. W.

**Diseases of the Eye. Manual for Students and General Practitioners.** Charles H. May, M.D., F.A.C.S. New York City. Twelfth Edition. Revised, Cloth, 12mo, 450 pages, 374 illustrations, including 23 plates with 73 colored figures. New York City, William Wood and Co., 1927.

This Manual of May is too widely known and appreciated to need extended notice. It is interesting to consider what qualities in it have brought it to its twelfth edition, with 10 reprints of an American edition, 5 editions and 7 reprinted in England, and 28 editions in 7 other languages.

As we see it, the selection of matter has been wisely made, to meet the needs of a large part of the medical profession thruout the world. It is well written. The successive editions have kept it up to date, without burdening the readers with matters of



transient interest. The wealth of illustrations tell far more than could be set forth in the same space by any text. Especially the plates in colors are of better quality and more abundant than in any other ophthalmic manual of the same size and price.

Another generation of physicians will find thru this manual a means of gaining that general yet definite view of ophthalmology, that every physician ought to have. E. J.

**Memorial Ophthalmic Laboratory at Giza.** First General Report, 1926. Rowland P. Wilson, Director. Paper, 8vo, 10 pages. Department of Public Health, Egypt, 1927.

This laboratory was started in 1913 by Dr. A. F. MacCallan, and has been kept up at Giza in temporary quarters since 1918. Dr. MacCallan's interest in it has continued since his removal to London in 1923; and now, as a memorial to Egyptians who fell in the Great War, 1914-1918, an appropriate building has been erected and devoted to the purposes of a Research Institute, examinations of pathologic specimens and postgraduate teaching. During 1926 there were 612 pathologic specimens hardened, cut and examined. This work will furnish a firm basis for reports to be submitted to the Ophthalmological Society of Egypt, and in some of the annual meetings in Europe. E. J.

**Transactions of the College of Physicians of Philadelphia,** Volume 48, 1926. Cloth, 8vo, 492 pages. Illustrated. Published for the College, Philadelphia, 1927.

This volume sustains, in every way, the high reputation of these transactions for scientific work and interest. The part of most interest to our readers is the Proceedings of the Section on Ophthalmology, 60 pages. These have already been published in this journal. There is also an article of 7 pages on Focal Infections and Ocular Disorders, read before the general meeting of the College in May last year, by Dr. George E. de Schweinitz.

The Section on Medical History gave its meeting of December 17th to four addresses on the history of ad-

vances in medicine and surgery in the last 50 years. These are abstracted in the Proceedings of the Section. One of them by Dr. de Schweinitz illustrates the History of the Advances in Medical and Surgical Specialties, taking ophthalmology as an example. E. J.

## CORRESPONDENCE.

### Presenting Papers in Section of A. M. A.

*To the Editor:*

In your July number I read with interest an editorial on "Time Wasted" from the pen, I presume, of Dr. Harry S. Gradle. As a previous secretary of the Section on Ophthalmology and one interested for many years in its meetings, I must take issue with Dr. Gradle. In my opinion, it is entirely proper for an author to use his 10 minutes in presenting the salient features of his paper, and I do not believe it to be time wasted.

This presentation should be done by means of a well digested summary. I believe this is the best method of bringing the subject matter of the paper before the audience, and that it helps to focus the discussion. Some of those present have not read the papers, others do not remember them well. For a small minority who have carefully read the paper the time is wasted. For the vast majority a summary is worth while. In some instances the summary will take but a few minutes. The author would be wise to stop there. At several meetings during the period when I was secretary, the authors of short papers were allowed but five minutes to present their subject; and I think that this might be a wise procedure with certain papers to follow in the future.

I believe that a well prepared summary of a paper should be given in each instance. Anything beyond this is time wasted; but I do not feel as Dr. Gradle does, that "the opening remarks of authors could be well dispensed with and the time thus saved (?) devoted to general discussion."

Very truly yours,  
GEORGE S. DERBY.

# ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

**Abadie, Ch. Medical Treatment of Glaucoma.** Acad. de Méd. 1927, March. Abst. Gaz. des Hôp. 1927, v. 100, p. 419.

The author believes that glaucoma is due to a disturbance of the innervation of the ocular sympathetic, causing an exaggeration of the dilatation of the ocular bloodvessels, and a consequent hypersecretion of the intraocular fluids with increase of tension. Upon this hypothesis he bases his treatment, which is, daily:

(1)  $1\frac{1}{2}$ -2 mg. of adrenalin, according to the age and weight of the patient.

(2) 10-20 cg. ergotin.

(3) 1-2 gms. calcium chlorid in an aqueous solution.

This has been used without any collyrium, with benefit in all cases. It caused the attacks of glaucoma, the halos, to disappear, with reappearance when it was discontinued. It checked the progress of the disease, with return of visual acuity, the amount depending on the previous progress of the disease. Even the chronic simple glaucomas which resisted all other treatments were benefited by this method.

C. L.

**Strohschein. Nonoperative Removal of Xanthelasma.** Klin. M. f. Augenh., 1926, v. 77, p. 552.

The author has successfully removed xanthelasma within the last 40 years with concentrated trichloracetic acid. The scars are smaller than the xanthelasmas, slightly grey and much less visible.

C. Z.

**Kimmyser, Joha Schappert. Entropion and Ectropion of the Iris.** Annales d'Ocul. 1927, March, v. 164, p. 165.

Clinical and histologic examination of eighteen eyes presenting entropion and entropion of the iris was given with a review of the literature. Previous hypotheses are insufficient to explain all cases. The cases of entropion

may be divided into three groups. First, where the entropion is caused by a band of connective tissue on the posterior surface of the iris extending from the pupillary border toward the ciliary body. Contraction of this band against the opposing force of the tonus of the sphincter pupillae folds in the pupillary margin. In the second group a band of connective tissue is attached to the anterior surface of the iris at the pupillary border and extends onto the anterior lens capsule. Here the contraction of the band pulls against the sphincter in a centripetal direction or against posterior synechiae if these are present. In this case there is also a folding in of the pupillary margin. The third group of cases present a combination of a band of connective tissue on the posterior surface of the iris which pulls centrifugally against a band from the anterior pupillary margin to the lens capsule which pulls centripetally. In this last group of cases normal function of the sphincter is not necessary to produce entropion.

In the cases of ectropion a band of connective tissue was found on the anterior surface of the iris extending from the pupillary border to the iris angle, contraction of which pulling against the tonus of the sphincter folds the pupillary border outward.

M. F. W.

**Larsen, Berthold. Argyrosis Corneae in Workers with Silver Nitrate.** Archiv f. Ophthal. B. 118, 1927, p. 145.

The author compares the various findings on ocular argyrosis as made by many observers reporting in the literature. The macroscopic and microscopic findings with the slit lamp are recorded of the eyes in five men working with silver nitrate for periods varying between ten and fifty years. Identical changes were found in all five varying in intensity according to the time of employment with the silver nitrate. Finely divided pitch-black particles of silver were found de-

posited in the conjunctiva, preferably on the caruncle, in the vicinity of the inferior fornix and around the limbus. In the cornea they were found infiltrating Descemet's membrane, in the lens forming a star shaped subcapsular opacity in the pupillary area. The vitreous was infiltrated with fine glistening particles and a greyish slaty colored veil was present on the surface of the papilla and in the nerve fiber layer of the retina.

H. D. L.

**Hoffmann, H. Hyaloid Canal in Man.** *Klin. M. f. Augenh.*, 1926, v. 77, p. 641.

A child, aged 8, suffered a contusion of his left eye with amaurosis, by a fall on a stone. There was no red reflex due to coarse greenish floating opacities in the vitreous. In the anterior chamber very fine suspension of glittering red dust and at the posterior capsule a fine yellowish strand like remains of the hyaloid, the tissue of the vitreous pervaded by a dense suspension of brown greenish particles. The arc of Vogt appears very clearly concentrically around the rest of the hyaloid. Here the dense surface of the vitreous is retracted like a navel and one sees deep into a funnel shaped tapering canal, with yellowish walls as far as the middle third of the vitreous. The author sees in this observation a proof of a central lymph path in the vitreous.

C. Z.

**Schiötz, Hj. Tonometer with Convex Plunger.** *Brit. J. of Ophthal.* 1927, March, v. 11, p. 116.

Since the author's previous contribution in the *British Journal of Ophthalmology*, 1920, setting forth a surprising difference obtained with plungers having a concave, plane and convex surface, he has not been able to abandon the idea of the convex plunger.

Further experiments show that just in the region which concerns us most, the deflections are not smaller but considerably larger than with the concave plunger. Therefore, he has worked further with the convex plunger in order to find the weight most suitable for clinical use and has arrived at 5.2 grm. (for the plunger and

its belongings) as the best. This weight gives a sufficiently large range, namely, from 5.6 mm. Hg. (deflection about 22 mm.) up to 90 mm. Hg. (deflection 0.) In the exceptional cases of higher pressure one can add a weight of 2 grm. and therewith measure up to 120 mm. Hg. The plunger has a diameter of 3 mm. and its tip is hemispherical.

The experimenter has named the tonometer with the convex plunger the "Schiötz x-Tonometer."

The new model differs from the old not only in the form of the plunger, but in having in place of the 5.5 grm. weight only a wire support for the upper end of the plunger. The 2 grm. weight can be placed easily on the end of the plunger.

The results of his experimental measurements are given by tables and graphs.

When comparative measurements with the two instruments are made on the same eye the readings are equally constant in each, but when they are made on a number of different eyes it is noticeable that in cases where the concave plunger gives uniform readings, the convex often shows slight variations which could hardly be attributed to error.

Schiötz believes that for the present it will be well to retain the concave plunger.

D. F. H.

**Monbrun, A. and Casteran, M. High Frequency in Ophthalmology.** *Archiv. d'Ophthalmol.* 1927, March, v. 44, p. 129.

Surgical diathermy or electrocoagulation was used in the treatment of adhesions and synechiae in scarred sockets after enucleation with excellent results. The bands of scar tissue are picked up with a hooked electrode and coagulated, using a current of about two to three hundred milliamperes. The absorption of this coagulated tissue leaves a very elastic and noncontratile scar.

Chalazia are destroyed by coagulating them thru the introduction of a needle electrode into their substance. Absorption is rapid and a very pliant scar is left. Angiomata, papillomata, and other small tumors of the lids and

bulbar conjunctiva were destroyed by coagulation. Follicular conjunctivitis was benefitted by medical diathermy applied to the lids two to three times weekly. Cilia in trichiasis were removed more easily by coagulation and with less reaction than by electrolysis. Keloids also were easily removed by coagulation. The coagulation current was always less than three hundred milliamperes and treatment of intraocular conditions was not done. The diathermy was not used in lacrimal sac affections on account of the danger of bone necrosis. The current must always be used with caution.

M. F. W.

**James, R. R. Krukenberg's Spindle in a Cataract Case.** *Brit. J. of Ophthal.* 1927, April, v. 11, p. 148.

The author was able to consult this patient's (aged 63 years) previous case record as far back as 1889. She had had a moderate retinal detachment and high myopia. James first saw her in 1911. Returning a year ago, her right eye presented a mature cataract. Situated deeply in the cornea was a vertically oval pigmented patch slightly to the nasal side. It had much the appearance of a peppery deposit. An uneventful cataract extraction was performed. There was no spindle in the fellow eye. With the slit lamp the corneal changes appeared more diffuse than with the loupe. One illustration.

D. F. H.

**Comberg, W. A New Method for X-Ray Localization in Eyeball.** *Archiv f. Ophthal.*, 1927, 118 Band, p. 175.

A Zeiss contact glass is marked with a little lead at four equidistant points to indicate the superior, inferior, external and internal limbi, when the glass is in position against the cornea. With this glass in position two photographs are taken with the injured eye directed straight forward, one an exact front view of the eye and the other a lateral at exactly right angles to the first view. There is obtained from the frontal exposure the meridian and the distance from the anatomic axis of the eyeball in which the intraocular foreign body lies. The lateral view gives

the depth posteriorly and in relation to the horizontal axis of the ball. Upon a chart for each of these two exposures there is plotted the position of the foreign body as obtained from each of the exposures. The author claims for this method an accuracy to 1 mm. for the anterior half of the eye and to 2 mm. for the posterior half.

H. D. L.

**Frank-Kamenetzki, S. G. Clinical Picture of Snow Blindness.** *Klin. M. f. Augenh.*, 1926, v. 77, p. 528.

The author observed at Irkutsk, Siberia, 26 cases of snow blindness: erythema of the skin of the face, blepharospasm, photophobia, lacrimation and pain, ciliary injection, some hyperemia of the palpebral conjunctiva without secretion. In quite a number of the cases he found superficial transient changes of the cornea, in some, erosions, and thinks that by a more careful examination the remaining 11 cases would also have shown superficial changes of the cornea. Thus the objective and subjective symptoms were not those of conjunctivitis, as snow blindness is described in the text books, and Samojloff believes that the essence of snow blindness is a traumatic keratitis caused by the ultraviolet rays to which, in some case by rubbing of the eyes, a conjunctivitis may accede secondarily.

C. Z.

**Koby, F. E. Superficial Reticular Degeneration of the Cornea.** *Archiv. d'Ophthal.*, 1927, March, v. 44, p. 149.

The literature is reviewed for case reports of this affection and a personal observation of one case by Koby is reported. Three outstanding biomicroscopic characters are presented: (a) zones of epithelial haziness with fine opacities, (b) fissures in the membrane of Bowman, (c) a raised line of epithelium. The fine opacities are arranged in a spiderweb pattern in the lower layers of the epithelium. The fissures in Bowman's membrane are not visible to the naked eye and border the zones of haziness. The epithelial line across the palpebral fissure is probably due to movements of the upper lid. The fissures in Bowman's membrane seem secondary to the opacities. Treatment is palliative as nothing seems to



clear the opacity. There is an hereditary factor involved, possibly sex linked. Diagnosis is simple with the slit lamp because of the fissures in Bowman's membrane and the lack of inflammation. These fissures are absent in the epithelial dystrophy of Fuchs. M. F. W.

**Bielschowsky, A. Amblyopia Ex Anopsia.** Klin. M. f. Augenh., 1926, v. 77, p. 302.

Altho considerable improvement of vision of amblyopic squinting eyes is relatively rare, the author, by reporting such cases of his own and from the literature, proves that a functional disturbance of squinting persons exists. A functional amblyopia apparently can only arise in early childhood from lack of use. The younger the individual the faster the vision of the eye not participating in the visual act declines; but the more easily it can be restored to seeing. After a certain age, perhaps six years, no amblyopia occurs even after not using the eye for years. With regard to the question whether the developing strabismus will be alternating or unilateral with amblyopia of the squinting eye, the author thinks that the predominance of one eye for fixation does not seem simply accidental. Possibly individual proclivities in the peripheral portions of the motor apparatus and the contiguous parts influencing the positions and movements of the eyes cause the majority of cases to favor the more comfortable direction of the eyes. Purely alternating strabismus is relatively rare; cases with equal or nearly equal bilateral vision prefer a certain eye for fixation, even if after covering it they can practice fixation for a longer time with the non-squinting eye. That, in these cases, no amblyopia develops in spite of suppression of the image of the squinting eye is partly due to the fact that the usually squinting eye spontaneously takes up the fixation for a shorter or longer time if the object arousing the attention lies near the line of fixation of the squinting eye. The favorable results of the therapy of strabismus in the first few years of life makes its continuance imperative. C. Z.

**Schaly, G. A. Rouget Cells on the Wall of the Capillaries in the Human Eye.** Doctorate Thesis, 1926, May. Ill.

The aim of the investigation was the determination of the presence or absence of Rouget's cells on the capillaries of the different parts of the human eye and their distribution along the different capillaries. It was necessary to begin with the study of these cells in the frog.

In 1847 Beeding expressed the opinion that the capillaries were built up from cells, not structureless tubes.

In 1863 Stricker saw spontaneous changes in the capillary lumen (irritation of the membrana nictitans in the frog); the narrowing of the lumen he considered caused by the swelling of the entire protoplasm of the endothelial cells.

Independently, Rouget, in 1873, had observed changes in the width of the capillaries of the tadpole and he produced these experimentally. The capillaries in the membrana hyaloidea of the frog he examined histologically: "from the smallest capillaries towards the arteries and veins, all vessels are surrounded by a sheath which contains an amorphous membrane without nuclei and a network of cellular branches." At the smaller capillaries with a diameter of 30  $\mu$ m. vesicular ovoid nuclei, situated along the vascular axis, are seen surrounded with a protoplasmic zone, from which branches form closed rings around the vessel. A certain regularity and symmetry is formed, which is absent with the plasma cells of the connective tissue. Toward the arteries and veins these nuclei containing parts of the net go slowly over in the tunica muscularis. The next year he had seen the contraction of these cells in salamander embryos.

In 1902, the cells, which Rouget had found, were rediscovered by S. Mayer. The cells of Rouget have been considered as contractile elements on the capillary wall, which regulate the blood stream in these (Krogh, Vimtrup, Gurwitsch, a. o.), which opinion is supported by the presence of nerve fibers found accompanying the capillaries; while K. W. Zimmermann does

not consider them chiefly active for the contractility of the capillaries, but serving principally the regulation of the fluid transport; contraction of the Rouget cells opposes filtration by their being pressed harder against the vascular wall.

The author examined the Rouget cells of the capillaries in the tongue of the frog and in its membrana hyaloidea and in the web of the larva, and further in the different parts of the human eye: the retina, the choriocapillaris, the corpus ciliare, the iris, the conjunctiva bulbi, the orbital fat tissue, the Horner's muscle, new formed capillaries in an organizing vitreous abscess, and in a pterygium.

In all these tissues they appear on the wall with their protoplasm more or less ramified. On the wall of the smallest capillaries these cells are situated in the axial direction of the vessel, while on the wall of larger capillaries, that part towards the arteriolae and venulae, these cells embrace with their nuclei the capillary wall in a more cross direction. The nearer the larger vessels the larger the angle becomes, i. e., the angle which the Rouget's cells make with the axial direction of the capillaries on which they rest; at the same time their number is here larger. They are situated farthest apart on the wall of the smallest capillaries. Measurements of the smallest capillaries, these being the ones which originate from larger vessels, which are themselves also capillaries, in the choriocapillaris at the macula lutea, the equator bulbi, the ora serrata and ciliary body, show that the distance in the center of the choriocapillaris is the smallest. Toward the periphery the distances become larger, while the Rouget cells on the capillaries in the corpus ciliare lie at about the same distance from one another as in the peripheral part of the choriocapillaris. This would speak in favor of their being able to control by their contraction the width of the capillaries.

The author could only demonstrate that the cross extending protoplasmic extensions of the Rouget cells form closed rings on capillaries at the places where these originated from larger vessels.

On wide capillaries the nuclei are

stretched and thin, the protoplasm, especially on the wall of very wide capillaries, lies smoothly expanded and possesses extremely fine extensions, which are mostly only visible with oblique illumination. On narrow capillaries the nuclei are short and thick and darker than in the cells of the wide capillaries. The protoplasm lies heaped around the nuclei as a thick mass and has short, thick extensions with a broad base.

The endothelial cells, especially the parts containing the nuclei, are thick and protrude into the lumen. The nuclei are shorter and thicker than in the wide capillaries.

It is possible that the cells of Rouget situated on the capillary wall cause narrowing of the capillaries. The differences in form, which they show on the wall of wide and narrow capillaries, may point towards this, while also the nerves, which accompany the capillaries in their course, support this supposition.

It is, however, difficult to imagine, that these cells situated on the wall, the protoplasm of which encircles the capillary wall only at the ramification, would be able to produce complete contraction of a capillary. The increased thickening of the endothelial cells on contraction, either actively or passively, must also be considered. The possibility that they play a role in the interchange of fluids in the manner that Zimmermann described is to be thought of.

It is attractive to consider the cells situated on the endothelial wall as cells which have a similar function to smooth muscle cells at other places in the circulatory system, that is as a continuation of the tunica muscularis of the larger vessels, because a gradual transition exists between the Rouget's cells and the circularly situated smooth muscle cells, on the walls of the arterioles and venules.

The Rouget's cells cannot be considered simple connective tissue cells.  
E. E. B.

**Howard, Harvey J. Experiences Among Chinese Bandits.** *Journal of the American Medical Association.* 1927, May 21, v. 88, p. 1669.

The majority of the bandits were

nearsighted—a condition determined by comparing their ability with mine in distinguishing distant objects. Their defect did not surprise me, since my examination of Chinese patients, for more than a decade, had revealed that nearly 60 per cent were myopic. None of the bandits wore spectacles (a Chinese cannot wear pince nez), but they took an undue interest in mine. Sometimes I had great difficulty in restraining them from keeping the spectacles, for the nose piece and temples were made of 18 carat gold. Each bandit in the gang tried them on several times—a proceeding which annoyed me almost as much as their using my towel. I feared, of course, that the spectacles might be broken, but my chief anxiety was concerning the possibility of my becoming infected with trachoma. Naturally, I cleaned the spectacles thoroly whenever I got them back.

I took the opportunity to examine all of the bandit's eyes for trachoma, and found clinical evidence of the disease in about 40 per cent. Several had corneal maculae as a result of ulcers due to trachoma. A dozen or so had pannus in varying degrees. The "old" ex chief, Jih Pen Tzu, the one who befriended me and with whom I shared a tiny mosquito tent for fifty-eight nights, had trachoma the worst of all. He developed two acute attacks of superficial keratitis with multiple ulcers while I was with him. With hot compresses alone, applied almost continuously for two or three days, I was able to bring him out of each attack comfortable and happy, and with his vision better than it had been for months. Undoubtedly it was my success in treating Jih Pen Tzu's eyes which gave him and the other bandits an increasing confidence in me, as the long days and still longer nights passed by.

It is not an exaggeration to state that this confidence gradually developed into a sort of friendship between Jih Pen Tzu and me—a friendship which exists to this day, for to Jih Pen Tzu I must give the credit for saving my life. As evidence of his attitude I might say that he has sent me my ring which had been taken from me by an-

other bandit. Furthermore, during the past year we have carried on a considerable correspondence in the Chinese language. Only last week he sent me his photograph with a request that I send him mine and also one of my family.

According to his last letter he will come to Peking to see me as soon as traffic is resumed on the Sungari which is icebound during the winter months. He is coming, he says, to get me to "cure his trachoma" and after that he hopes I will get him "a suitable job in Peking." Each of these objects obviously offers certain difficulties, but the latter certainly more than the first. At any rate Jih Pen Tzu evidently trusts me not to deliver him over to the military authorities, and in that assurance he is safe.

**Smith, J. Russell. Barraquer's Operation.** Brit. J. of Ophthal. 1927, April, v. 11, p. 152.

The author contributes a severely critical analysis of Professor Barraquer's article in Dr. W. A. Fisher's book on senile cataract. He discusses the construction of the pump, instruments, method of application and method of removal of the lens. His conclusions are that the zonule is not ruptured by the vibrations, but by the pushing of the lens backward. This seems particularly true in view of the fact that the so-called vibrations are practically nil. If the attempt is made to extract the lens, either the weaker lens capsule which is sucked into the cup will rupture, or the instrument will pull away entirely, due to the greater strength of the zonule. If the zonule is ruptured by pushing the lens backward as the author believes, version is then necessary and the lens is delivered by pushing and not pulling it out.

The author has gone into the subject very thoroly and with his experiments he has been unable to verify many of Barraquer's statements. Pneumatic forceps were first introduced by Stoewers. D. F. H.

**Zeidler, M. Posterior Encephalocele of the Orbit.** Klin M. f. Augenh., 1926, v. 77, p. 390.

In a child of eight months a tense

elastic tumor had developed in a few months at the region of the right lacrimal gland. At operation a cyst was found extending into the depth of the orbit. It contained clear cerebrospinal fluid which continued to ooze. After ten days the opening closed but was followed by meningitic symptoms. By daily lumbar punctures purulent liquor with streptococci was evacuated. The meningitic symptoms subsided after incision of the former wound. The wound closed and after three months the child was perfectly normal. Histologically, the cyst showed flat connective tissue cells with glious tissue and at one place tissue of cerebral cortex. There were no ganglion cells. No doubt the encephalocele was thru the superior orbital fissure. C. Z.

**Polak, A. C. Tuberculosis as Cause of Chronic Uveitis.** Doctorate Thesis, 1926, May.

Having shown in an historical review the increasing importance of tuberculosis as an etiologic agent in eye diseases, especially of the uveal tract, the author gives reports of 50 patients from the Groningen ophthalmologic clinic.

Besides the routine ophthalmic examination, including the slit lamp, a general internal examination was made of all patients, with roentgen photo of the thorax, the skin reaction of von Pirquet, a subcutaneous injection with old tuberculin of Koch, the seroreaction of Wassermann for active tuberculosis and the Wassermann reaction for lues.

The seroreaction for active tuberculosis was described by Wassermann in the *Deutsche med. Wochenschr.* 1923, March, no. 10. In 21 clinically positive cases from the surgical clinic the reaction was positive in all, in 16 cases from the same clinic treated for nontuberculous conditions the reaction was negative in all. However, the value of the reaction is not universally accepted. The cases are divided into three groups.

1. Cases in which the diagnosis of tuberculosis of the uvea was certain because of the presence of tubercular foci in the body and a focal reaction in the eye. Here also were small visible

nodules in the iris in 14 cases. It is remarkable how few symptoms of tuberculosis of other organs the patients with iridocyclitis show. Even in very severe ocular affections with atrophy of the bulb and numerous atrophic spots in the iris, no signs at all or only very little of a tubercular process in other organs were found. All these patients reacted to the tuberculin injections with a general, local and focal reaction.

2. Cases in which the patient was thought to be suffering from tuberculosis but on account of the absence of a focal reaction in the eye, it could not be demonstrated that the uveitis was also tuberculous. Of these there were 23 cases. Some showed distinct lung tuberculosis; most, however, showed only dubious signs of tuberculosis. All gave local and general reactions to tuberculin but not focal. Altho some had nodules in the iris, which suggested strongly tuberculosis, it could not with certainty be said that the ocular affection was of tuberculous origin, because of absence of focal reaction.

3. Cases in which a chronic uveitis was present, but where it was not certain that the patient had an active tuberculous process, nor that the ocular affection was tuberculous. In this group there were 13 cases. Here are found cases of iritis with nodules, iridocyclitis with strong serous exudation and broad synechiae, iridocyclitis with large dirty gray precipitates on the posterior surface of the cornea and cases of iridocyclitis combined with episcleritis or keratitis profunda.

Only one case had a positive Wassermann reaction for lues, and in none was there a history of syphilis. In four cases the high evening temperature, the positive Pirquet, the positive seroreaction for active tuberculosis, pointed to the likelihood of a tuberculous process. In three cases there were no general symptoms at all, in two of these the seroreaction for tuberculosis was also negative. In two cases the roentgenphoto showed suspicious shadows. In nine cases the seroreaction for tuberculosis was positive. In seven cases the von Pirquet



was positive, five cases, therefore, suggested a tuberculous process tho a certainty of localization was not procured.

The author concludes that many cases of so-called idiopathic chronic iridocyclitis are surely of tuberculous origin. Cases of iridocyclitis similar in their clinical course to the surely tuberculous ones, tho it is impossible to demonstrate tuberculosis, in the absence of other causes are probably tubercular. In these cases there always remains the possibility of another, yet unknown cause, so that we, at the present time, certainly have not the

right, reasoning exclusively from the clinical picture and without more detailed examination, to make the diagnosis of tuberculous uveitis as some do.

The seroreaction of Wassermann for active tuberculosis in its present form cannot be considered in ophthalmology as a perfectly trustworthy method of diagnosis, but a positive reaction is strongly in favor of existant tuberculosis, as the results in these cases run rather parallel with the results of other methods. Of less value is a negative result.

E. E. B.

## NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. H. Alexander Brown, San Francisco; Dr. Wm. Thornwall Davis, Washington; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. George H. Kress, Los Angeles; Dr. Edward D. LeCompte, Salt Lake City; Dr. W. H. Lowell, Boston; Dr. G. Oram Ring, Philadelphia; Dr. Charles P. Small, Chicago; Dr. G. McD. VanPoole, Honolulu.

### DEATHS

Anthony Bewis Russell, East Orange, New Jersey, age fifty-five, died June thirtieth, of angina pectoris.

John Howard Payne, Boston, emeritus professor of ophthalmology, Boston University School of Medicine, died May twenty-seventh of heart disease, at the age of 72 years.

### SOCIETIES

During the annual conference of the National Committee for the Prevention of Blindness the following members of the Board of Directors were elected: Bishop William Lawrence, Corinne Roosevelt Robinson, and Conrad Berens, M.D., to take the place respectively of the following deceased members: Charles W. Eliot, Louisa Lee Schuyler, and Cleveland H. Dodge.

The thirty-second annual meeting of the American Academy of Ophthalmology and Oto-Laryngology to be held at Detroit, September 12 to 16 will be marked by a number of innovations. The Section on Instruction that has heretofore been arranged to follow the regular scientific program will, this year, be reorganized so that its work will occupy three and one half hours each morning on Wednesday, Thursday and Friday. On Monday the Examining Boards on Ophthalmology and Oto-Laryngology will hold their examinations, at the Harper Hospital and Oto-Laryngology at the Shurly Clinic beginning at 8 a. m. The joint session will be held Tuesday morning, and the business meeting in the evening during a trip on the Detroit River. The Section on Ophthalmology will meet Tuesday and Thursday

afternoons, the Section on Oto-Laryngology Wednesday and Friday afternoons. The special guest of the Academy this year, General Herbert S. Birkett, M.D. of Montreal, will deliver an historical address at the joint session Tuesday morning. The programs for the scientific sessions and the Section on Instruction are combined. The Graduate instruction will be given in 58 Conferences, some of them being repeated on two or three successive days. Of these conferences 31 are devoted to subjects related to ophthalmology and 27 to subjects related to otolaryngology. A full program of entertainment has been arranged covering all the evenings and including a golf tournament on Monday afternoon.

### PERSONALS

Dr. William Humes Roberts, of Pasadena, California, is spending a vacation in Honolulu.

Dr. Emil Deutsch, of Chicago, will spend a few weeks in Vienna this summer.

Dr. Frank Brawley, with his family, is spending the summer months motoring through central Europe.

Dr. Burton Chance of Philadelphia sailed in June for Europe with Mrs. Chance to remain until September.

Dr. Harry Benson, Oakland, Nebraska, has been elected president of the Nebraska Academy of Ophthalmology and Oto-Laryngology.

Dr. Paul J. Sartain, of Philadelphia, sailed on July seventh for Europe to remain until late in September.

Dr. Charles E. G. Shannon, of Philadelphia, sailed on Saturday, July second, on

the S.S. Winnewaska with Mrs. Shannon for London. Dr. and Mrs. Shannon will return to this country late in August.

Dr. Casey Wood, who is now in London for the summer, has recently been elected an Honorary Member of the Charaka Club, New York, in recognition of his contributions to the History of Medicine.

Dr. and Mrs. E. C. Ellett, of Memphis, recently sailed from Quebec for Liverpool. They expect to join the Casey Woods in London, and from there on will touch the high places only. Doctor and Mrs. Wood will be home this fall for the first time in several years.

At high noon Saturday, July twenty-third, Dr. Wm. C. Finnoff, of Denver, was married to Dr. Virginia C. Van Meter, a most charming and practical young physician of Denver. Dr. Finnoff and his bride served a buffet luncheon on the 24th to the guests of the Colorado Congress at their summer home in the mountains.

Dr. and Mrs. Harry L. Baum, of Denver, served a buffet supper to members of the Colorado Ophthalmology and Oto-Laryngology in the evening, to whom Dr. George L. Richards, of Fall River, Massachusetts, related some of his experiences in India.

Dr. W. L. Fox recently returned to Cleveland after having engaged in postgraduate study in Ophthalmology at the New York Post Graduate Medical School, New York City. He is now located in the Guardian Building.

Dr. A. B. Bruner, Senior Clinical Instructor in Ophthalmology in the School of Medicine of Western Reserve University, Cleveland, recently gave a series of lectures on "The Refraction of the Human Eye" to Cleveland school teachers, who attended the Summer Session, conducted by the Board of Education at the Cleveland School of Education.

#### MISCELLANEOUS

Under the will of the late Mrs. W. H. McMillan, St. Louis, one million dollars was bequeathed for the McMillan Eye, Ear, Nose and Throat Hospital.

The Washington Hospital at Washington, Pennsylvania, was bequeathed \$200,000 by the late Miss Margretta Parkinson, for the erection, equipment and maintenance of an annex for the treatment of eye diseases. The donor was blind for many years.

The Brooklyn Eye and Ear Hospital and the Williamsburg Hospital have consolidated under the name of the Brooklyn Eye and Ear Hospital. To house the new institution there will be erected a seven-story, fireproof, \$1,500,000 structure on Green Avenue.

A new school building for Chicago's blind is being erected by the Improvement Association for Blind People. It will be called the Chicago Lighthouse. It represents an investment of about \$50,000. It will contain every device that is used in educating the blind to enable them to earn their own living. The second floor of the building is reached by an incline built on a curve, so the sightless ones will not have to climb stairs.

The twelfth annual report of the National Committee for the Prevention of Blindness shows that the amount of blindness due to ophthalmia neonatorum in schools for the blind, decreased from 23% during the period of 1908-1912 to 12.5% during the period 1923-1926. Sight saving classes in the United States have increased from two in 1913 to two hundred and sixty-five in 1926. The Committee has continued to promote the use of mechanical devices in industries to save sight; to educate employers in the necessity for these devices, which have resulted in a very great lessening in ocular injuries to the employees.

A six day intensive Trachoma Clinic has just been completed on the Blackfeet Reservation under the direction of F. C. Campbell, Supervisor, Northwest Indian Reservations. Two years ago a similar clinic was held at Browning and the latest survey proved that by this surgical procedure, the statistics of cases fell from 30% to 3% of the population. During this last week, one hundred and thirty cases of trachoma were operated upon. The methods adopted were grattage—Darier's method—upon the milder types and in the chronic forms, tarsectomy. Three senile cataracts, two enucleations with immediate implantation of a gold ball, six cases of pterygium, eight cases of entropion, one tattooing with India ink for leucoma of the right eye of a young Indian girl, two cases of chronic glaucoma, and several minor defects, also a rare form of lipoma of both corneas.

## Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in *heavy-faced type*. The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper.

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FIG. 6

ECHINOCOCCUS CYST OF ORBIT  
(HOWARD'S CASE)

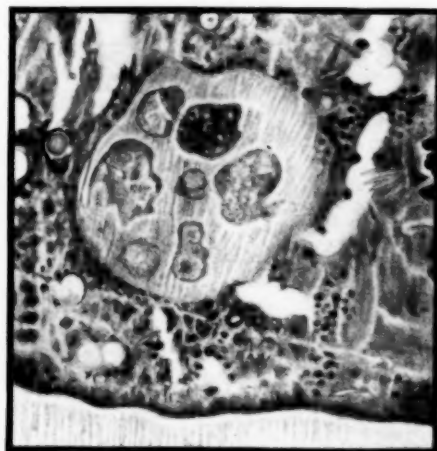


FIG. 7



FIG. 8

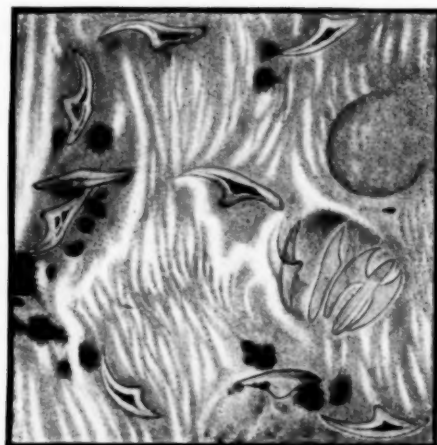


FIG. 9

FIG. 6. POUCH (PINK-STAINED) OF ECHINOCOCCUS CYST, WITH CHITINOUS WALL OF ENDOCYST ON EACH SIDE. A DAUGHTER CYST CONTAINING SEVERAL GRAND-DAUGHTER CYSTS NEAR LEFT CHITINOUS WALL. X 40.

FIG. 7. ENLARGED VIEW OF DAUGHTER CYST AND GRAND-DAUGHTER CYSTS. NOTE ZONE OF EOSINOPHILES, ECHINOCOCCUS HOOKLETS AND ONE ROUND CALCAREOUS BODY, PROBABLY A DEGENERATED RUDIMENTARY DAUGHTER CYST. X 255.

FIG. 8. HIGH POWER VIEW OF DAUGHTER CYST CONTAINING ECHINOCOCCUS HOOKLETS AND SURROUNDED BY A ZONE OF EOSINOPHILES. X 515.

FIG. 9. HIGH POWER VIEW OF INTRACYSTIC DEBRIS CONSISTING OF SET OF ECHINOCOCCUS HOOKLETS, FREE HOOKLETS AND EOSINOPHILES. X 515.